SELECTED NEWARK BAY FACILITY SITES AND CANDIDATE PRPS

VOLUME I

EVIDENCE CONCERNING
TROY CHEMICAL CORPORATION, INC.

Prepared for:
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Troy Chemical

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TROY CHEMICAL COMPANY, INC.
ONE AVENUE L
NEWARK, ESSEX COUNTY, NJ
EPA ID # NJD002144517

GENERAL INFORMATION AND SITE HISTORY

Troy Chemical Company, Inc. is located at 1 Avenue L in a heavily industrialized section of Newark, Essex County. The company has manufactured specialty paint additives at this 6 acre facility since approximately 1956. Prior to 1956 the site was utilized by numerous industries including American Cyanamid/Calco, Heller and Merz, and Amalgamated Dyestuff and Chemicals for the manufacture of a variety of chemicals and dyes.

The site has been subdivided many times since the early 1900s making it difficult to assess exactly who previously owned/operated which portions of the present Troy site. However, review of Sanborn Fire Insurance Maps covering the time period between the early 1900s and 1951 revealed the current Troy site, along with the Albert Steel Drum/Prentiss Drug and Chemical site located directly north of Troy's facility, were actually part of one large operation. This facility extended from Wilson Avenue almost to Delancey Street in a north to south direction, and from Avenue L to the railroad tracks in a west to east direction. It is unknown exactly when the larger site was divided into its present day dimensions but it is believed the final subdivision occurred sometime in the early to mid-1950s.

According to the Sanborn Maps, Heller and Merz Company, a manufacturer of colors and dyes, operated here from 1908 to 1931. From 1931 to 1951 the maps indicate that Calco Chemical Company and American Cyanamid occupied the property. The dates provided in the Sanborn Maps are very rough estimates since these maps were only updated periodically. It is probable other industries also operated at the site between 1908 and 1951 but commenced and ceased operations between the periodic updates of the maps.

A deed search at the Essex County Hall of Records indicates the following ownership chronology: (note: due to the lack of records prior to 1951, accurately determining the exact owners is difficult)

Current owners -	Troy Chemical Company, Inc.
June 24, 1980 -	New Chemical Corporation purchased the property from the Troy Chemical Corporation. In actuality, New Chemical was formed to purchase the assets of Troy Chemical, and immediately after the acquisition changed its name to the Troy Chemical Corporation, Inc. (current owners). The name New Chemical Corp. was used to avoid confusion at the time of aquisition. (note: many of the principles of the former Troy chemical Corportation are involved with Troy Chemical Corp. Inc. and New Chemical in similar capacities).

November 5, 1960 -	Troy Chemical Corporation purchased the property from the Pulaski Skyway Realty Corporation. At this time a separate industry, the Wilson Refining Company, was leasing and operating out of Building 61.
February 20, 1951 -	The Pulaski Skyway Realty Corporation purchased the property from the Pulaski Skyway Realty Company.
December 28, 1945 - and August 7, 1946	The Pulaski Skyway Realty Company purchased portions of the property from American Cyanamid/Calco.
April 20, 1938 -	Calco purchased a portion of the property from Amalgamated Dyestuff and Chemical.
December 29, 1932 -	Calco purchased a portion of the property from Harry L. Huelsenbeck, sheriff of Essex County. This portion of the site was formerly owned by the Monarch Distributing Company and apparently auctioned off in a sheriff's sale by Mr. Huelsenbeck.
March 12, 1930 -	Calco purchased 28 tracts of land from the Heller and Merz Company.

Further searching through the deeds revealed much of this area was owned by private citizens prior to 1930.

Although land use in the immediate vicinity of the site is characterized by heavy industry, numerous large residential sections of Newark, Kearny and Harrison exist within a 3 mile radius of the site. The nearest residential area to the site lies approximately 0.5 mile to the north within the City of Newark. Additionally, demography for the area cannot be limited to the established populations. Extensive "transient" populations are continuously present at the Newark Airport and the New Jersey Turnpike and may be susceptible to sudden releases from the Troy facility. The Newark Airport is approximately 1 mile south of the site and the Turnpike is less than 2000 feet to the east.

SITE OPERATIONS OF CONCERN

Troy Chemical Company manufactures a variety of specialty chemicals used in the paint industry as preservatives, biocides, dryers, rheology agents (flow agents), surfactants and dispersants. Non-mercurial biocides are the company's major product, accounting for approximately 52% of Troy's total operations (based on 1987 percentages). The remainder of Troy's total operations are incorporated in the production of driers (19%), surfactants

(12%), LLBA (6%), defoamers (4%), dispersants (3%), rheology agents (3%), catalysts (<1%) and anti-skinning agents (<1%). The company also formerly manufactured mercury based compounds which were used as preservatives and bacteriocides in paint. According to company officials, mercury related operations accounted for approximately 6% (based on 1986 production totals) of the company's total operations; however, the manufacture of these compounds ceased in February 1987. The company maintains the above referenced information concerning the production totals is confidential, and should remain confidential under statutes set forth in section

Production of the speciality chemicals occurs almost exclusively through batch mixing and blending operations. Due to the extensive number of compounds manufactured by the company and the limited knowledge of the majority of the manufacturing processes, only general process schemes for organic fungicides, metallic soaps (drying agents) and mercury compounds will be discussed in this report.

The production of Troysan Polyphase products, the tradename for Troy's organic fungicides, involves mixing monoethanolamine and paraformaldehyde in a reactor and then heating the mixture. The resulting product is filtered off and the filtrant is adjusted to the proper concentration. According to company officials, no waste is generated in this process. Spent filter paper from all manufacturing processes is reportedly shipped off site as hazardous; however, the fate of the filtrate is unknown.

Metallic soaps, including those containing zinc, lead, zirconium, cobalt, copper, magnesium and calcium are manufactured in Buildings 90 and 91. Each specific type of metallic soap is manufactured to a predetermined content of the particular metal. For instance, the metallic soap Troymax Lead 24% (tradename) would be a lead soap containing 24% lead.

The general process scheme for the production of the metallic soaps involves mixing an organic acid and a solvent in a reactor. The metal source (usually a metal oxide) is added and a reaction is accomplished through heating and agitation. The metal source, as well as the organic acid and solvent, varies for the production of each specific type of soap. Excess solvent/water is separated and used in the next batch for that particular soap. According to company officials, there is no waste generated during these processes.

The production of the mercury compounds appears to have been the most involved of all of Troy's manufacturign operations. Mercury was purchased in metallic form and converted to mercuric oxide. The mercuric oxide was the major precursor in the production of organic mercuric compounds such as phenylmercuric acetate, choromethoxypropyl mercuric acetate, phenyl mercuric sulfide and phenylmercuric oleates.

This first step in this process involved washing mercury metal to triple distilled purity by allowing the mercury to fall through a column containing an acid solution. This mercury washing generated approximately 2 to 3 gallons of acid solution every few months (note: the fate of this acid solution is unknown). The washed mercury metal was then reacted with concentrated nitric acid to form mercuric nitrate. The mercuric nitrate was reacted with sodium hydroxide and the resultant mercuric oxide removed by filtration. The filtrate from this process was one of the major sources of mercury bearing wastewater, accounting for approximately 700 gallons of wastewater per batch with an average of 10 batches per week. Spills, leaks and equipment washings from this operation were another source of mercury-bearing wastewater.

In the manufacture of the organic-mercuric compounds from the mercuric oxide, only the production of the phenyl mercuric sulfide resulted in wastewaters to be discharged (not recycled back into operation).

Of the four organic-mercuric compounds manufactured by the company, only described in any detail. This process involved the mixing of benzene, acetic acid and mercuric acid in a reactor. The resulting PMA was adjusted to the proper concentration by the addition of solvent. After the reaction was complete, the vessels were rinsed with benzene and the solution generated placed in drums for use in the next batch.

Reportedly all discharged mercury bearing wastewater, including that generated in the production of mercuric oxide and phenyl mercuric sulfide, entered a sulfide precipitation treatment system. This system should not be confused with the company's overall wastewater treatment system and therefore, to avoid confusion in the report, we will refer to the two systems separately as the mercury bearing wastwater treatment system and the overall plant wastewater treatment system.

Prior to 1965, all process wastewaters, including untreated mercury bearing wastewaters, were discharged to Pierson's Creek which roughly bisects the site north to south. From 1965 to 1976, the mercury bearing wastewaters were treated by sulfide precipitation prior to being discharged to Pierson's Creek; however, all other process wastewaters were still being discharged untreated into the creek. In 1976, the overall plant wastewater treatment system was installed, receiving both the effluent from the mercury bearing wastewater treatment system (prior to cessation of the mercury operation) and the wastewaters from all of the "non-mercury" processes.

The mercury-bearing wastewater treatment system consisted of two settling tanks (A and B), a reaction and precipitation tank, a plate and frame filter press and another settling tank. The mercury bearing wastewater was discharged to Settling Tank A and liquid was allowed to overflow to Settling Tank B where the pH was adjusted to approximately 9.0. The wastewater was apparently discharged to the neutralization tank where calcium sulfide and iron sulfate were added. After agitation, the wastes were filtered and the filtrate recycled until the mercury content was reduced sufficiently for discharge to the Passaic Valley Sewage Commission (PVSC). However, prior to discharge to the PVSC the wastewater was treated in the overall plant wastewater system. Filter cake remaining on the filter paper was heated to drive off the mercury. This heating probably occurred in the three on site muffle type furnaces used by the company to recover mercury from sludges and other solid materials. A discussion of the muffle furnaces will be included in the section on the air route. After the mercury was driven from the filter cake, the remaining material was disposed of in the on site dumpster. According to Mr. Milton Nowak, Vice President of Troy Chemical, the material disposed of in the dumpster consisted basically of clay and iron oxide; however, it is unknown if this material had been analyzed.

The overall plant wastewater treatment system received the wastes from the mercury bearing wastewater treatment system in addition to waste streams from other company processes. However, as was previously stated, the company reincorporates much of their cleaning solutions generated from washing the process equipment back into the next reaction for that particular process, thereby limiting the amount of wastewater generated. Herein lies a disparity between various reports as the company's IWMF worksheet states wastewaters entering the treatment system are "generated from the washing of reactors used during production process operations".

The wastewater from the washings and spills is collected in sumps located in the process building. From here the wastewater is discharged to a 10,000 gallon collection tank. An oil/solvent layer is allowed to form on the surface and is then discharged to a 5,000 gallon tank where it is stored until a large enough quantity is collected for offsite removal. According to company officials, it takes approximately 1.5 to 2 years for a large enough quantity to accumulate to make it economically feasible for removal. This waste is considered hazardous.

The "water" remaining in the 10,000 gallon collection tank is then pumped to a second 10,000 gallon tank where neutralization and precipitation occur. The wastewater is then filtered and the filtrate is discharged to the Passaic Valley Sewage Commission (PVSC) under provisions provided in a sewage connection permit (#20403290). Troy Chemical continuously monitors the effluent discharge to the PVSC for LEL and pH. The effulent is also monitored quarterly for Biological Oxygen Demand (BOD), Total Suspended Solids (TSS) and petroleum hydrocarbons (PHCs). The effluent was formerly monitored for mercury triweekly prior to the cessation of the mercury processes.

The fate of the precipitate, filtrant and spent filter material (cloth) generated during the filtration and precipitation stages of the overall wastewater treatment system is unknown. According to Ed Capasso, Environmental Manager for Troy, the filter material consists of a cloth mesh; however, he believes most of the solid passes through. Also of interest is the fact that the wastewater remaining after the oil/solvent layer is not analyzed for volatile organics because it is not believed to be necessary. However, this does not take into consideration the possible presence of substances such as TCE and tetrachloroethylene which are more dense than water and would sink rather than float.

Another source of confusion concerning the Troy facility is the determination of the company's RCRA status. In November 1980, the company submitted a Part A RCRA application for storage of hazardous wastes in containers and tanks. The company was subsequently listed as a RCRA TSD facility. However, when the EPA requested submission of the Part B application in 1982, the company claimed they "need not store hazardous wastes on site for more than 90 days and accordingly hereby withdraws its application for a RCRA permit". Troy was delisted to generator only status in October 1983 by the USEPA and, after considerable controversy, by the NJDEP in August 1984. The two separate dates for delisting occurred as a result of variance in the state and federal regulations concerning classificastion of TSD facilities. Under New Jersey regulations, a facility which stores hazardous wastes in tanks for a period of time is considered a TSD whereas, under federal regulations, tank storage of hazardous waste must occur for more than 90 days for a facility to be classified as a TSD.

The company's RCRA status becomes even more confusing in light of the fact that hazardous waste (the oil/solvent layer from the wastewater treatment plant) is currently stored on site in tanks for a period exceeding 90 days. Based on this information, the company would be considered a TSD under both state and federal regulations. However, under criteria set forth in NJAC 7:14A-4.2(a), the company avoided TSD classification by being considered a Industrial Waste Management Facility (IWMF) under Division of wastewater treatment facility receiving an influent wastewater which is a hazardous waste and generating a residue (the oil/solvent layer) which is also considered hazardous. Since the hazardous waste storage tank is an integral part of the wastewater treatment system, the tank falls under IWMF regulations. A "gray" area exists between IWMF and RCRA classification in that a company can be considered a TSD as well as an IWMF if the residue generated is stored in containers for longer than 90 days. However, the same does not apply for tank storage. Since containers and tanks would both be considered RCRA regulated units under normal circumstances, the loopholes which exist in the current regulations do not appear to be justifiable. The major concern with the company being classified as an IWMF only is that no secondary containment is required around the IWMF hazardous waste units.

As was previously stated, the oil/solvent layer from the wastewater treatment process is collected in a tank until enough has been generated to make it economically feasible to transport it off site. Solvents Recovery Service (SRS) of Linden, New Jersey formerly received the majority of Troy's oil/solvent wastes. According to Mr. Cappasso, the last shipment of the hazardous oil/solvent material occurred sometime in 1986. Mr. Capasso stated another shipment should be made sometime in 1988.

Other hazardous waste (from a RCRA standpoint) generated at the facility included spent sorbent booms from Pierson's Creek as well as filtrate and spent filter paper from the manufacturing processes. It is believed these wastes are stored in drums; however, drum storage reportedly occurs for less than 90 days. The filtrate and filter paper are assumed to be hazardous and have been shipped by AETC to an incinerator in North Carolina operated by Stablex. The sorbent booms which were placed in Piersons Creek to contain spills will be discussed in the section on surface water.

A review of aerial photographs at the NJDEP, Office of Environmental Analysis revealed numerous suspicious areas which also warrant further investigation. Areas of concern from the photographs reviewed will be discussed in turn.

Photographs covering the period 1934 to 1940 (photos dated November 1934, April 6, 1940 and April 28, 1940) revealed that most of the current Troy site was undeveloped; however, a few buildings were present on the eastern side of Pierson's Creek. These buildings were probably part of the American Cyanamid/Calco site previously referenced. It appears that landfilling operations had begun throughout much of the remainder of the current Troy site, especially on the western side of Pierson's Creek. In the 1954 photo, what appears to be drums are located in the landfill area. It is unknown if the landfilling was related to the American Cyanamid/Calco operations.

Photographs dated April 7, 1951 and December 5, 1953 revealed a more defined landfill area. An access road to the landfill(which is outlined in white) is visible in the 1951 photograph. Buildings and a few above ground tanks are present on the eastern side of the creek. The 1953 photo reveals a suspicious white area in the approximate center of the landfill and possible stained ground near what would be the northern border of the current Troy site.

The most revealing of all of the photographs was that taken on April 20, 1961. More buildings and aboveground tanks are present on the eastern side of Pierson's Creek. Although it cannot be substantiated by the aerial photographs only, it appears hundreds of drums were stacked for burial in the southwestern quadrant of the landfill area. It is difficult to assess if this suspicious area would actually be on the present-day Troy site as the landfill area appears to have extended well beyond (in a westerly direction) the present day Avenue L.

The March 25, 1972 aerial photograph revealed the majority of the facilities are still located on the eastern side of Pierson's Creek although aboveground tanks are also present on the western side of the creek. Most, if not all of the site is still unpaved.

Photographs from August 6, 1978 revealed the company's operations had grown immensely. Above ground tanks and thousands of drums are evident throughout the site. Most of the site still appears to be easily accessible.

The most recent photographs reviewed were taken on March 23, 1986. Most of the site appears to be unpaved and resembles its present day state; however, one suspicious area was noted in the southwestern portion of the property.

GROUNDWATER ROUTE

The Troy Chemical Company site lies within the Peidment physiographic province of the Appalachian Highlands physiographic division. Geology in the area is characterized by formations of Recent, Pleistocene and Triassic Age deposits.

Each of these units as they relate to the site will be discussed in turn. General information pertaining to geology in the vicinity of the site was obtained from the USGS Special Report #10 entitled, "Preliminary Report on the Geology and Groundwater Supply of the Newark, New Jersey Area" and Special Report #28 entitled "Groundwater Resources of Essex County, New Jersey". More site specific data was obtained from a hydrogeological study performed for Troy Chemical by Wehran Engineering in 1981. This study included installation and monitoring of six onsite monitor wells.

Since the two streams which transverse the site are actually man-made drainage ditches, unconsolidated recent deposits, originating from stream deposition are not an integral part of the site geology.

According to boring logs developed during installation of the onsite monitor wells, the uppermost "geologic" unit at the site would consist of fill material ranging from 6 to 10 feet in depth. The presence of fill is consistent with the information obtained during review of the aerial photographs. It is interesting to note that Boring Log 3A indicates a huge void was encountered at a depth of 6.2 feet. The location of Boring 3A would very roughly approximate the area of possible drum burial observed in the 1961 aerial photograph. According to the boring logs, the fill material appears to consist of concrete, bricks, cinders, wood and boulders as well as sand and gravel. Monitor Well 3A is screened exclusively in this unit.

The first naturally occurring geologic unit encountered would be the unconsolidated sediments of Pleistocene Age. The Pleistocene sediments could be divided into two general categories, stratified or unstratified drift. These sediments consist basically of clay, silt, sand, gravel and boulders. The deposits in the Newark area are mostly considered unstratified drift deposits and are therefore not heavily utilized as a groundwater source since sufficient quantities of water can only be obtained from deposits in the stratified drift. For the purpose of this report, the lithologic units described in the Wehran Engineering boring logs occurring between the fill material and the residual bedrock encountered in Boring 1 will be considered as the Pleistocene Deposits. According to the boring logs these include lacustrine as well as glacial till deposits. Only one boring (Boring 1) was progressed into the Brunswick Formation, therefore the thickness of the Pleistocene deposits at the site can only be assessed from this one boring (assuming the Pleistocene deposits are the entire unit between the fill and the Brunswick Formation). The depth of this unit, as determined from Boring 1, is approximately 65 feet thick. According to the boring logs, no extensive aquifer system (sand or gravel) is present at the site, however most of the units within the Pleistocene deposits, especially within Borings 2 and 3, were reported to be saturated, possibly indicating that this system does not serve as an adequate aquitard and is capable of groundwater storage and transmittal. Therefore, vertical and horizontal migration of contamination is possible. All of the wells, with the exception of Monitor Well 3A, are at least partially screened within the Pleistocene deposits. Groundwater flow in these deposits appears to be in a south-southeast direction.

The last unit encountered is the Brunswick Formation, which consists of consolidated shales in the vicinity of the site. Although the primary porosity of the shale itself is extremely low and inadequate for storage and transmittal of groundwater, secondary porosity resulting from cracks and fractures provides ample space for groundwater storage. Numerous industrial and cooling water wells in the vicinity of the site draw from the Brunswick Formation. Review of well records at the NJDEP/Division of Water Resources/Bureau of Water Allocation also indicated a few wells in the Newark area utilize the Brunswick Formation for domestic purposes; however, officials of the Newark City Water Department claim that everyone in Newark is connected to the city water supply. This water is obtained from the Pequannock and Wanaque water sheds. Only Boring 1 was progressed into the Brunswick Formation; however, the well screen was ended in the Pleistocene deposits. Due to the nature of the Brunswick Formation, with groundwater transmittal occurring through cracks and fractures, no definitive grounwater flow direction can be ascertained.

Contamination of the Brunswick Formation resulting from site activities is possible due to the leaky nature of the Pleistocene deposits and the fact that the Brunswick Formation probably receives most of its recharge from the overlying units.

The six Monitor Wells were sampled on four occasions between August 1981 and May 1982 by the Wehran Engineering Company. Split samples were obtained by NJDEP on two of these occasions. A summary of the available groundwater data is included in Tables 1 through 6.

The wells were initially sampled by Wehran Engineering on August 25, 1981 detected in all six wells; however, only the concentration in Monitor Well 1A (9.3 ppm) exceeded the Groundwater Quality Criteria Guidelines of 5 ppm. Mercury was detected in five of the wells with the concentrations above the Groundwater Quality Guidlelines of 2 ppb in each of these wells. Concentrations of mercury ranged from 85 ppb in Monitor Well 2 to 22.96 ppm in Monitor Well 2A.

Both the NJDEP and Wehran collected samples from the six wells on November 11, 1987 (see tables 2 and 5). Samples collected by the NJDEP were analyzed for mercury, copper, lead, zinc, pesticides/PCBs, chloride and COD. The Wehran samples were analyzed for purgable organics, pesticides/PCBs, COD, chloride, mercury, copper, lead and zinc. Analysis of the Wehran samples again revealed mercury contamination above the Groundwater Quality Guidelines in the same five wells as during the August 25, 1981 sampling episode. In addition, the levels of copper in Monitor Wells 1A, 2A, 3; lead in 2, 2A and 3; benzene in 1A, 2 and 3A; chlorobenzene in 1A; tetrachloroethylene in well 3A; 1,1,1-trichloroethane in 3A; and TCE in 2A and 3A were above the Groundwater Quality Criteria. Toluene was also detected in low concentrations in all six wells. Extremely high concentrations of chlorides were also detected in all six wells, but this probably attributable to salt water infiltration. The NJDEP samples also revealed concentrations of mercury above the Groundwater Quality Criteria in every well with the exception of Monitor Well 2. The metals fraction for the Monitor Well 2 sample was not properly preserved and therefore not analyzed. It should be noted that although the mercury concentrations were above the Groundwater Quality Criteria, they were at levels much lower than those detected in the Wehran samples. The discrepancies in the concentrations may be a result of differing sampling and/or analytical protocols. Also, since it cannot be ascertained whether the samples were actually split properly between the two sampling groups (DEP and Wehran), it is possible the aliquots collected by each group had varying concentrations of contaminants. Of special interest in the NJDEP samples was the presence of 7.5 and 6.5 ppb of Aroclor-1254 in Monitor Wells 2 and 2A, respectively. Since Aroclors do not readily migrate through the soil column and into groundwater, the source of the Aroclor contamination in these wells may be the result of "tainted" fill or the actual disposal and burial of Aroclor wastes. Another possibility is that migration was facilited by the presence of solvents which acted as carriers. The wells were again sampled by Wehran Engineering on May 14, 1982 (see Table 3). The samples were analyzed for mercury only, with the concentrations in all six wells above the Groundwater Quality Criteria. The highest concentration, at 12.5 ppm was again detected in Monitor Well 2A.

On May 27, 1982, the wells were sampled again by NJDEP and Wehran (see Tables 4 and 6). The NJDEP samples were analyzed for a variety of parameters including arsenic, cadmium, lead, mercury, hexavalent chromium, cyanide, chloride, COD and volatile organics. The Wehran samples were analyzed for mercury only. The concentrations of mercury in all six wells for both the NJDEP and Wehran samples were above the Groundwater Quality Criteria, with the concentrations detected in the Wehran samples again well above the concentrations in the NJDEP samples. Here again the differences in concentration may be attributable to varying sampling and/or analytical procedures. Other analytes surpassing the Groundwater Quality Guidelines included arsenic in Wells 1, 1A and 3A; lead in 2 and 3; cyanide in 2A and benzene in 1A, 2A and 3A; and chlorobenzene in 1A and 2A. Numerous aromatic compounds were also detected in many of the samples.

On November 17, 1989, NJDEP Bureau of Planning and Assessment (BPA) conducted a Site Inspection (SI) which included the sampling of Monitor Wells 2 and 2A to be analyzed for the Target Compound List (TCL) plus 30 peaks and PHCs. Analysis of Monitor Well 2 showed levels of cadmium (18 ppb), chromium (241 ppb), lead (1,140 ppb), PHCs (7,600 ppb), and benzene (2,600 ppb) above Groundwater Quality Criteria Guidlines as well as low levels of other organic compounds. Analysis of the deeper well (Monitor Well 2A) revealed levels of chromium (118 ppb), lead (515 ppb), mercury (4.96 ppb), benzene (2,200 ppb), and toluene (18 ppb) over clean-up levels as well as low levels of other organic compounds. See Table 11 for complete results.

Monitor Wells 1 and 1A were not sampled due to the fact that they had been destroyed and covered over with macadam. Monitor Wells 3 and 3A were not sampled because the covers could not be removed without removing part of the well casing.

It is important to note that many of the contaminants detected including mercury, lead, copper, zinc and benzene are highly utilized in many of the company processes possibly implicating Troy Chemical as at least a partial contributor to groundwater contamination in the area. Also noteworthy is the presence of contamination in both the shallow and deep monitor wells indicating vertical migration of the contaminants. The extremely high concentrations of mercury consistently detected in Monitor Wll 2A, especially in the Wehran samples, may represent evidence of a small pocket (plume) of contamination in the vicinity of this well.

SURFACE WATER ROUTE

Two small drainage ditches exist within the Troy Chemical site. The two ditches converge near the approximate southern border of the Troy site, eventually discharging to Newark Bay. Tank farms, process buildings and storage areas line both sides of the westernmost drainage ditch known as Pierson's Creek which bisects the site north to south. According to reports, Pierson's Creek was originally part of a private drainage system which extended to a stream known as Dead Creek. This system was constructed sometime in the mid 1800s when this area of Newark was first being developed. Although the current origin of Pierson's Creek is unknown (Dead Creek cannot be located on present day maps), it appears to run underground upstream of the Troy Site, at least partially through the Albert Steel Drum/Prentiss Drug Site, finally surfacing at a point approximately 50 yards north of Troy's property. As the creek enters the Troy site, the drainage ditch turns into a concrete flume. The City of Newark installed the flume in 1956; however, it is not known if it is continuous until the creek terminates at Newark Bay. In June 1977, the company installed a containment wall along the flume to prevent the migration of spilled/leaking materials into Pierson's Creek; however, numerous inspections revealed cracks and holes in the wall which permitted materials to discharge directly into the creek.

The easternmost creek roughly borders the eastern edge of the Troy site and is labeled as a tributary to Pierson's Creek on various reports. This creek was reportedly part of Newark's storm drainage system as early as 1910. The origin of this creek is unknown. This creek is also concrete lined.

As previously stated, all of Troy's process wastewaters (including mercury bearing wastewaters) had been discharged untreated into Pierson's Creek from the mid-1950s to 1965. From approximately 1965 to 1976, mercury bearing wastewaters were treated by sufide precipitation prior to being discharged to the creek; however, all other process wastewaters continued to be discharged untreated. Finally in 1976, the overall plant wastewater treatment system was installed resulting in the treatment of all wastewater before discharge. The fate of precipitate generated from the sulfide precipitation process (operating from 1965 to approximately 1987) is unknown.

In July 1977, Troy applied for a NJPDES permit to discharge noncontact cooling water, boiler blowdown and condensates into Pierson's Creek. This permit (#0031453) was effective from May 31, 1978 to September 30, 1980. Six discharges, designated 001 to 006, where included in the initial permit. The following describes the sources of the discharges:

001 - non contact cooling water from reactor vessels and blowdown from cooling towers.

002-003 - boiler blowdown - only active in winter.

004-006 - steam condensate from steam traps on heaters and other steam lines.

In March 1980, Troy submitted a renewal application for their NJPDES permit, however as a result of deficiencies in the renewal application due in part to the transfer of the company's assets, which occurred at this time, the NJDEP refused to recertify Troy's NJPDES permit. Although the permit was not renewed until August 1985, the company continued to discharge to Pierson's Creek. According to Michael Russo of the NJDEP/Division of Water Resources/Bureau of Industrial Waste Management, a company would be allowed to continue discharging under the previous permit limitations as long as the revised permit renewal application was submitted in a timely manner, which apparently occurred in this case. Prior to obtaining the renewed permit, Troy discontinued the discharges from Discharges 002 to 006. Under provisions of the renewed permit, which is valid until September 30, 1990, the company is required to monitor Discharge 001 on a monthly basis for flow, pH, temperature, TSS, COD and oil and grease. In addition, this discharge is monitored quarterly for benzene, mercury, zirconium, cobalt and iodine. Review of the Discharge Monitoring Reports (DMRs) for the period covering January 1986 to June 1988 revealed the company has had only one excursion of any of the permit limitations. The excursion occurred in April 1988 when the Total Suspended Solids limitation of 50 ppm was exceeded by a TSS of 70 ppm. It should also be noted, that 20 ppb of benzene was reported in the January 1988 DMR.

Although the DMRs, especially those from 1986 to the present, show commendable NJPDES compliance, non NJPDES regulated sampling (either sampling conducted prior to the company obtaining their NJPDES permit or samples of non NJPDES regulated discharges) reveal gross contamination of Pierson's Creek and its sediment. Due to the extensive sampling of discharges to the creek, the creek sediment and the creek itself, each individual sample will not be discussed in this report. However, a brief description of significant data collected will follow.

On August 18, 1977, the NJDEP/Division of Water Resources collected samples of discharges to Pierson's Creek, as well as samples of the creek itself. The sources of the discharges included an onsite septic tank, cooling water from the Mercury Distillant Plant, the fungicide plant and the boiler room. The parameters selected for each sample were specific to the discharge source location. For example, the septic tank discharge was analyzed for parameters usually associated with sewage such as nitrates, nitrites, ammonia, chloride and various indicator parameters. The indicator parameters include, but are not limited to, color, pH, total solids and COD. (Note: these indicator parameters were also analyzed in other samples but for the remainder of the report will be referenced only as indicator parameters). Two water samples, one upstream and one downstream of the septic tank, were collected from Pierson's Creek and analyzed for the same parameters as the septic tank discharge samples. Of interest in the two stream samples was the increase in ammonia and nitrites in the downstream sample. The highest level of these contaminants was detected in the discharge sample itself with the level in the downstream sample approximately one half the concentration detected in the discharge sample:

	<u>DISCHARGE SAMPLE</u>	<u>DOWNSTREAM SAMPLE</u>
Ammonia	26.1 ppm	16.4 ppm
Nitrite	0.010 ppm	0.0006 ppm

The results of these samples indicate that the company's septic system was discharging sewage into Pierson's Creek. Dye testing of the company's toilet facilities during a previous NJDEP inspection revealed the location of the septic tank discharge.

The sample of the cooling water discharge from the Mercury Distillant Plant was analyzed for chromium (total and hexavalent), copper, lead, zinc, mercury and indicator parameters. High levels of mercury (42.2 ppb) as well as low concentrations of lead (0.001 ppm), copper (0.020 ppm), total chromium (0.002 ppm) and zinc (0.525 ppm) were detected in this sample.

The Fungicide Plant sample was analyzed for mercury, lead, zinc, chromium (hexavalent and total), calcium, iodine, pesticides and indicator parameters. In addition to 39 ppb of mercury, significant concentrations of iodine (4.0 ppm) and ronnel (8.7 ppm), an insecticide, were detected in this sample. Low concentrations of zinc, lead and total chromium were also detected. The pH of this sample was reported to be 10.3.

Stream and discharge samples were again collected by the NJDEP on September 1, 1977. Two stream samples were collected from Pierson's Creek, one upstream sample near the northern portion of site just as the stream enters the Troy site and one onsite sample from near the Mercury Reclaiming Plant. Both samples were analyzed for mercury, lead, zinc, chromium (hexavalent and total in the downstream sample, total only in the upstream), sulfate and indicator parameters. Of greatest significance in these two samples was a greater than five fold increase in mercury concentration in the downstream sample indicating a discharge from an onsite source was contributing to contamination of the creek.

Two discharge samples were also collected on September 1, 1977. Sources of these samples consisted of overflows from the wooden cooling water tank and the boiler room. Both of these samples were analyzed for similar parameters including mercury, lead, zinc, sulfate, total chromium, calcium and indicator parameters. In addition, the sample from the wooden cooling tower was analyzed for iron. Mercury, zinc, calcium and sulfate were detected in low concentrations in both of the samples. Iron and total chromium were also detected in the wooden cooling tower and boiler room overflow samples, respectively.

Mercury and zinc were detected in a sample of cooling water discharge from the Mercury Distillant Plant collected by the NJDEP on December 8, 1977. Besides zinc and mercury this sample was also analyzed for arsenic and indicator parameters.

Nine samples, including four surface water and five sediment samples, were collected along and near Pierson's Creek during an inspection by the USEPA on June 6, 1979. All of the samples were analyzed for mercury content only. Two of the water samples were collected directly from Pierson's Creek, one upstream and one downstream of the Troy facility. A significant increase in mercury in the downstream water sample (56 ppb versus 0.5 ppb) indicates the Troy facility is the source of the largest portion of the contamination. It should be noted that the concentration of mercury detected in the sediment samples decreased in the downstream versus upstream sample. This may be due to migration of insoluble forms of mercury from the upgradient Albert Steel Drum/Prentiss Drug site which also has documented mercury contamination. However, since Pierson's Creek can be considered tidal, contaminated sediment can also be carried short distances upstream during tidal stages. This effect (higher concentrations in upstream versus downstream samples) would not be apparent in water samples unless sampling occurred as the tide was coming in.

As a result of the information obtained during the June 6, 1979 inspection, the USEPA requested a search warrant to investigate the site under provisions provided in section 1318(a) (B) of the Clean Water Act. In the request for the warrant, the USEPA indicated the company was discharging mercury in possible violation of their NJPDES permit. The warrant was subsequently issued by the U. S. District Court for the New Jersey District with an investigation being conducted by the USEPA on July 12, 1979. During the investigation, water and sediment samples were collected from Pierson's Creek at locations 5 and 100 feet upstream of the Troy Site, 100 and 250 yards downstream and at two locations within the site. Of the four samples collected on site (two water and two sediment), two samples (one water and one sediment) were collected approximately 50 feet upstream of the southern edge of the plant near Dicharge 001, and the two other samples (one water and one sediment) were collected near the mercuric oxide manufacturing area. All of the water samples were analyzed for heavy metals and Total Organic Carbon (TOC). The sediment samples were analyzed for mercury only. Four additional water samples were collected from Pierson's Creek and analyzed for volatile organics. Of the four additional samples, one was collected approximately 5 feet upstream of the Troy Site, one within the site, downstream of all the manufacturing processes and two at locations 100 and 250 yards downstream of the Troy property. A summary of the data is included in Table 7.

The majority of volatile organics detected in the downstream water samples were at higher concentrations than in the upstream (background) sample, indicating most of the contamination is emanating from the Troy site. Also of interest are the concentrations of mercury in the sediment samples, especially those collected from within the Troy site boundary. A substantial increase in mercury concentration in Pierson's Creek is evident in the samples collected from onsite sources versus samples collected from upgradient offsite sources. Although the mercury concentrations detected in the upgradient offsite samples should be considered significant (140 ppm, 100 feet upstream and 191 ppm, 5 feet upstream), the concentrations in the onsite samples (22,400 ppm and 11,600 ppm) are indicative of continuous discharges and/or spills of insoluble forms of mercury over several decades. Also of interest is the increase of mercury concentration in the downstream (3,120 ppm, 100 yards downstream and 244 ppm, 250 yards downstream) versus the upgradient offsite samples (see above).This further substantiates that the company's activities have seriously impacted the quality of Pierson's Creek. In addition to the sediment samples from Pierson's Creek, one sediment sample was also collected from the easternmost creek. Mercury was detected at 83,200 ppm in this sample.

The NJDEP performed additional sampling of the creek and discharges to such on August 2, 1979. A total of eleven samples were collected including seven discharge samples, two stream samples from Pierson's Creek and two sediment samples from Pierson's Creek. Apparently, one of the discharge samples actually discharged to the sanitary sewer, and therefore will not collected from the designated NJPDES Discharges 001, 005 and 006. The sample from Discharge 001, which was analyzed for volatile organics, mercury, arsenic, COD, and oil and grease, contained low concentrations of mercury (11 ppb), oil and grease (1.6 ppm) and COD (19 ppm).

Discharge 005 was analyzed for mercury and COD only, with 45 ppb of mercury and 12 ppm COD being detected. Similar concentrations of mercury (51 ppb) and COD (8 ppm) were detected in the Discharge 006 sample which was analyzed for volatile organics in addition to mercury and COD. Although the limitations for the six discharges in the initial NJPDES permit (issued in May 1978) are unknown, the concentrations detected in these samples were well below the current NJPDES limitation for Discharge 001. It should be noted however, that no mercury limitation has been established. One of the other discharges sampled on August 2, 1979 reportedly originated from the oil/water separator influent which discharges to Pierson's Creek (the oil/water separator was apparently located within Pierson's Creek).

This sample was analyzed for volatile organics and oil and grease. Significant quantities of benzene (726 ppb), tetrachloroethylene (500 ppb), and 1,2-dichloroethane (7250 ppb) were detected in this sample. A sample of the intake from Pierson's Creek leading to the oil/water separator also revealed the presence of benzene, tetrachloroethylene and 1,2-dichloroethylene, but at much lower concentrations than in the oil/water separator influent sample entering Pierson's Creek. The last discharge sample collected originated from the onsite locker room and was analyzed for parameters associated with sewage. Extremely high coliform counts in this sample indicated untreated sewage was being discharged directly into the creek.

Two water samples were collected from the creek itself, one from a location 5 feet upstream of the northern property line and one directly downstream of the southern property line. The upstream sample was analyzed for oil and grease, total chromium, arsenic, mercury and volatile organics; the downstream sample for phenols, oil and grease, total chromium, arsenic, volatile organics, mercury and pesticides.

A comparison of the concentrations of mercury, benzene, and arsenic detected in the two samples revealed a very slight increase in the downstream sample for each analyte, again indicating the company was contributing to surface water contamination. Phenols (102 ppb) and diazinon (1.62 ppb) were also detected in the downstream sample. Tetrachloroethylene, 1,2-dichloroethane, toluene and xylenes were detected in the upstream sample but not in the downstream sample, leading to the conclusion that the Troy Chemical Company is not the sole contributor to the contamination of Pierson's Creek. Sediment samples were also collected at upstream (10 feet north of the northern property line) and downstream (immediately inside the southern site boundary) locations. Both samples were analyzed for volatile organics, mercury, arsenic and total chromium. Although the concentration of mercury was lower in the downstream sample, 4.3 ppm versus 4.6 ppm in the upstream sample, the concentrations of arsenic and chromium were approximately four and ten times greater respectively, in the downstream versus upstream samples. Also of interest were the concentrations of chloroform (>50 ppm), 1,2-dichloroethane (7.815 ppm) and benzene (12.5 ppm) in the downstream sample. No volatile organics were detected in the upstream sample. A point worthy of reiteration is are (or have been) heavily utilized in the company's processes.

On April 28, 1980, six discharge samples and four soil samples were collected by the NJDEP. The soil samples will be discussed in the section concerning soils. Two of the discharge samples were collected from stormwater discharges to the easternmost drainage ditch (the tributary to Pierson's Creek) and were to be analyzed for mercury, copper, lead, arsenic and zinc. However, due to insufficient sample quantities, only mercury analysis was performed on one of the samples; the arsenic analysis was deleted on the other sample. In one of the samples a mercury concentration of greater than 3 ppm was reported. Mercury droplets were reportedly only as further substantiation of the company's continuing contribution to contamination of Pierson's Creek, but also as evidence that secondary containment at the site is inadequate to prevent spills and leaks from migrating to the creek. Based on these results, it could also be concluded that spills are not contained and removed promptly creating numerous "non-point source discharges" which ultimately permit the contaminants to migrate to the creek via stormwater runoff, overflows, etc.

Wehran Engineering collected water and sediment samples from Pierson's Creek in August of 1981 (exact date unknown). Three sediment samples identified as Upstream #1, Midstream #2 and Downstream #3 were analyzed for total solids, volatile solids, COD and mercury. The supernatant from the sediment samples was analyzed for total organic carbon and mercury. Review of the data for sediment and supernatant samples revealed elevated levels of mercury in the upstream samples relative to the downstream samples. However, all three samples were collected well within the Troy site, therefore, the upgradient sample cannot be considered truly indicative of the contamination being contributed by offsite sources. It should also be noted that many of the mercury process areas were located along Pierson's Creek near the Upstream #1 sample location. Also of interest in the sediment samples was the progressive increase in the concentration of volatile solids and COD in the midstream and downstream samples revealing the presence of oxygen demanding constituents (possibly the volatile solids) in the middle and lower sections of the creek. Two water samples were also collected from the creek, one just as the creek enters the site (background) and one as the creek leaves the site. The samples were analyzed for mercury and zinc with elevated levels of both contaminants present in the downstream sample. Here again, the increase in contamination in the downstream sample revealed soluble forms of zinc and mercury are continuously being discharged to the creek from the Troy site.

On May 1, 1985, one sample was collected at NJPDES Discharge 001 by the NJDEP. The sample was analyzed for indicator parameters including chloride and COD. A field pH measurement using pH paper was also taken, with the reported value of 5.0 being below the NJPDES permit limitation of 6.0 standard units. Also, the level of COD (220 ppm) exceeded the NJPDES permit limitation of 50 ppm. The level of COD was estimated, however, since the sample was improperly preserved.

During the November 17, 1989 NJDEP, BPA Site Inspection, five surface water and seven sediment samples were collected and analyzed for the TCL plus 30 peaks. Surface Water/Sediments 1 through 4 were collected in Pierson's Creek with 1 being slightly upgradient of the facility and 2,3 and 4 located progressively downgradient.

The following contaminants were detected in Surface Water (SW)-1: benzene (10 ppb), lead (103 ppb), mercury (10.8 ppb) and PHCs (5,300 ppb). Analysis of SW-2 revealed detectable levels of volatile and semi-volatile organic compounds as well as elevated levels of lead (105 ppb), mercury (8.2 ppb) and PHCs (1,400 ppb). Detectable levels of volatile and semi-volatile organic compounds were found in SW-3 as well as elevated levels of 1,1,1-trichoroethane (210 ppb), trichoroethene (100 ppb), benzene (70 ppb), tetrachloroethene (60 ppb), lead (194 ppb), mercury (7.5 ppb) and PHCs (1,700 ppb). Analysis of SW-4 revealed detectable levels of volatile and semi-volatile organic compounds along with lead (263 ppb), mercury (66 ppb) and PHCs (7,400 ppb). SW-5, which was collected from a storm drain in the center of the current operational portion of the site, showed elevated levels of methylene chloride (460 ppb), lead (230 ppb) and PHCs (28,000 ppb).

While the surface water samples show a pattern of slightly elevated levels of organics, metals and PHCs from upstream to downstream samples, results of the concurrent sediment sampling are much more indicative of long-term discharges.

Progressively increasing levels of some organic and inorganic substances were found in Sediments-1 through 3 with Sediment-4 exhibiting lower values than Sediments-2 and 3. Of significance to this investigation is the pattern of increasing volatile organic, copper, lead and mercury concentrations. Table 8 represents upstream to downstream concentrations in Pierson's Creek sediment. See Table 11 for complete results.

Additionally, 4,4'-DDD, cadmium, chromium and zinc were detected in significant amounts in these samples; however, the higher upstream concentrations may be indicative of contaminants migrating from offsite sources.

Sediments-5, 6 and 7 were collected in the tributary to the east of the site, with Sediment-5 located upstream, Sediment-6 midstream and Sediment-7 downstream. As with Sediments-1,2 and 3, these samples indicate a pattern of increasing contamination from upstream to downstream locations. Table 9 summarizes the significant results.

The numerous samples which have been collected by the NJDEP, the USEPA and Wehran Engineering indicate that both permitted and unpermitted discharges by the company have had a detrimental impact on surface water quality in Pierson's Creek and its tributary. Although most of the samples collected were from continuous or common sources, another source of contamination from the company's activities, direct spill discharges, should also be considered. Historically, spills, leaks and poor housekeeping have contributed to contamination of the surface water by migrating to the creeks via storm water runoff, overflows, etc. Since the runoff, overflows, etc. would actually dilute the concentration of contaminants present, these discharges, although significant, may not be as deleterious to the creek as the direct spill discharges of pure product and/or wastes. Review of available information has revealed at least three "minor" spills of various substances including naptha, mineral spirits and sewage have occurred at the site since February 1987. These spills were reportedly contained and the spilled materials removed before any of the materials migrated off site. It is unknown if any unreported spills have occurred

Prior to 1987, however, direct spill discharges to Pierson's Creek apparently were commonplace. Many of these spills were not reported to the NJDEP by the company, as required in the Spill Act, but rather from complaints or "tips."

One such spill incident occurred in January of 1984 with the NJDEP being notified of the spill by the New Jersey Division of Criminal Justice. Samples collected by Division of Criminal Justice personnel revealed the creek upgradient of the site was clear, while downgradient of the site a brown and green liquid covered the surface of the stream. Field testing indicated the brown liquid was flammable. The exact source of the spill could not be determined by Marc Gruslovic of the NJDEP who responded to the spill, however the source was believed to be from near or within Building 91. Building 91 is currently a process building and probably served a similar function at the time of the spill. It is unknown if the aforementioned samples were ever analyzed. Troy Chemical contracted Clean Venture to contain and remove the spill material. The company claimed the green material observed was a dye, formerly manufactured by American Cyanamid when they operated at the site, which emanates from the ground whenever it rains.

A series of spills had also occurred in the fall of 1978 and the winter of 1979. The succession of events pertaining to these spills were reported by Ed Faille of the NJDEP. These events as they pertain to discharges to Pierson's Creek will be discussed in the following paragraphs. Further information concerning Mr. Faille's inspections will be discussed in the Other Considerations section under the heading "Unstable Containment of Wastes."

The first spill was inadvertently discovered by Mr. Faille on October 12, 1978 while inspecting the adjacent Albert Steel Drum site. Mr. Faille reported that oil was present in Pierson's Creek within the Troy site boundry. Upon further investigation of the Troy facility, numerous point source and non-point source discharges were discovered entering Pierson's Creek. The point source discharges included, "a pump that was leaking around the packing, discharging the waste materials into the stream", and a sump pump within the containment area for a tank whose contents were reported to be "metallic dryers and metallic naphthalene". The non-point source discharges included substances leaching into the creek from varoius onsite locations. The exact source of the oil observed by Mr. Faille was not reported, however, officials of Troy Chemical claimed that it originated from upstream sources. Several samples were colected during the inspection but apparently were never analyzed.

On October 19. 1978, Mr. Faille reinspected the site and observed numerous environmental problems including a white substance in the stream sediment. Several samples were collected but apparently were never analyzed.

Mr. Faille again inspected the site on October 26, 1978. During the inspection, it was observed that many of the discharges had been discontinued and a collection box was installed to prevent the leachate from discharging directly to the creek. In addition, the white sediment was removed from the creek and a boom was placed in the creek near the downstream property boundary. An inspection on November 1, 1978 revealed the collection systems were working effectively and the company was about to install an oil skimmer in the creek. According to company officials the material entrapped in the collection box was placed in drums for disposal off site. The disposal location for these wastes is unknown.

On January 17, 1979, a spill originating from a process room behind the offices (probably Building 91), had again entered Pierson's Creek. The spilled material reportedly contained mineral spirits, high flash naptha, oleic acid, naphthenic acid and alkali soluble methacrylate polymer. In addition, the overall conditions of the entire facility had deteriorated to its previous state. The company contracted Olsen and Hassold to contain the spill which, due to the large quantities involved, took more than a week to contain and remove. The spill reportedly extended downstream to Delancey Street. In response to the spill and the continuous discharges leaching from the walls of concrete flume, filter fences were installed by Olsen and Hassold. Leach boxes were also to be installed at the south side of the site.

A followup inspection on January 29, 1979, however, revealed another spill had entered the creek and again apparently originated from Building 91. According to Troy's maintenance personnel, they were ordered to pump this material into the stream because heavy rains caused flooding in the process building. Mr. Nowak, Vice President for the company, denied that the maintenance personnel had beeen ordered to discharge to the creek. The spilled material was subsequently rerouted to the company's pretreatment system under the direction of Mr. Faille and a contractor (Olsen and Hassold, Inc.) was hired to clean up the spill.

A followup inspection was performed by Mr. Faille on December 11, 1979. Although the overall facility conditions had improved, the pollution abatement systems installed in Pierson's Creek were not operating properly. Company officials reported they would repair these systems to proper operating conditions. However, a final inspection on December 13, 1979 by NJDEP personnel had revealed the conditions at the site were again deteriorating and the pollution abatement devices in the creek were not working properly.

Another noteworthy incident occured during an inspection by NJDEP personnel on June 2, 1977. At this time, Milton Nowak, Vice President of Troy Chemical, claimed that the only discharge entering the easternmost drainage ditch originated from a cesspool overflow. The exact location and current status of the cesspool is unknown. During the inspection, numerous discharges were also observed entering Pierson's Creek.

Based on the information available it is clearly evident that past and present activities by Troy Chemical have seriously impacted the quality of water and sediment in Pierson's Creek and its tributary, both onsite and downstream of the facility. The surface water in this area is used for recreational, industrial and commercial purposes.

AIR ROUTE

The NJDEP/Division of Environmental Quality has received numerous complaints concerning odors and releases from the Troy facility, however inspections conducted to verify these complaints have been inconclusive.

On August 30, 1983, an explosion in one of the reactor vessels resulted in a release of contaminants including butyl isocyanate into the atmosphere. Although the exact cause of the explosion was not determined, it was believed an improperly operating agitation unit within the reactor was at least partially responsible. According to company officials the reactor contained hydroiodo propene which was dissolved in high flash naptha. The reactor was then charged with butyl isocyanate which normally results in an exothermic reaction. Apparently the mixture was not properly agitated, allowing a layer of butyl isocyanate to form and causing the reaction to proceed with an increase in heat and pressure which could not be controlled by the cooling coils. According to reports, the entire contents of the reactor vessel was emptied in the explosion.

Improperly operating muffle type mercury recovery furnaces have also resulted in atmospheric releases of contaminants. On May 28, 1981 a stack test was performed on the three recovery furnaces to determine if mercury vapors were being emitted. The furnaces had been operating for approximately two years under a temporary certificate (#40322) prior to the stack test. The furnaces were designed to recover mercury from various solid materials including sludges and batteries. These materials would be placed on a pan which was sealed inside the furnace. The furnace was heated by underfired gas burners to a temperature where the charge material (sludge and batteries) reached the vaporization point of mercury. At this point the mercury to be recovered volatilized resulting in mercury emissions which were run through a series of water cooled condensors. The liquified mercury was then collected from the condensors. However, during the stack test it was noted very little flow was being emitted through the ejector Venturi Scrubber where the emission test was to take place indicating emissions were leaking from the system before reaching the air pollution control device (the scrubber). It was determined mercury contaminated emissions were leaking from the charge doors on the furnaces. It was also believed that contaminants other than products of combustion were being emitted from the stacks. As a result of the improperly operating furnaces and control devices, notices of violation were issued to the company by the DEQ and it was recommended further stack testing be conducted prior to issuance of an approved permit (certificate). According to the Division of Environmental Quality's stack log for the company, the muffle furnaces were deleted from active operation on June 12, 1985. It is unknown if a subsequent stack test was ever performed on these furnaces.

To date, no environmental air sampling data for the site is available.

It should be noted that 74 stacks are listed on DEQ's stack log for the facility. Of the 74, 59 currently have certificate (permit) numbers although many have been deleted (currently inactive) and others are temporary. The sources of the stacks include but are not limited to, above ground tanks, reactor vessels and furnaces.

During a October 6, 1989 NJDEP,BPA Presampling Assessment (PSA) ambient air readings of up to 18 ppm on the OVA as methane and over 20 ppm on the HNu as isobutylene were observed. Additonally, numerous point sources of elevated readings were noted as well as a strong paint or acrylic odor.

SOIL

Much of the site was recently paved, thereby covering most of the exposed soil surfaces; however, inspections by the NJDEP in the late 1970s and early 1980s revealed visibly contaminated soil throughout the site, apparantly the result of spills, leaks and overall poor housekeeping. On numerous occasions leaking drums were observed being stored on the exposed ground surface. Many areas of the site were also noted to contain mercury droplets.

On May 7, 1976, it was reported that cobalt hexoate and calcium hexanoate were leaking from one of the tank farms into the surrounding soil, eventually discharging into one of the on site drainage ditches. Reportedly the contaminated soil was subsequently removed and disposed of at Kin Buc Landfill in Edison, New Jersey. Apparently no analysis of the soil in this area was performed before or after it was removed, therefore it cannot be determined if all the contaminated soil was properly removed.

In September 1977, the company collected soil samples at various locations throughout the site. These samples were analyzed for mercury content only. Concentrations of mercury ranged from 0.046 ppm in the sample identified as Clean Fill #2 collected near the polyphase plant, to 0.55 ppm in the sample indentified as Container #1 taken near Avenue L. The sample collection procedures and exact sample locations are unknown.

On April 28, 1989, NJDEP collected four soil samples in addition to the surface water samples which were referenced previously. The data is summarized on Table 8. The most contaminated of the four samples was collected near an onsite dumpster. The exact location of this dumpster is unknown. This sample was analyzed for copper, lead, arsenic, mercury, pesticides and volatile organics. As indicated in Table 8, seven of the contaminants detected were above the NJDEP/Recommended Cleanup Levels for these contaminants. In fact, the concentration of each individual volatile organic detected was above the cleanup level for total volatiles of 1 ppm. Relatively high concentrations of DDT and many of its breakdown products were also detected. Another highly contaminated sample was collected on the south side of the Fungicide Plant. This sample was analyzed for copper, lead, arsenic, zinc and mercury, with the concentrations of copper, lead, zinc and mercury above the NJDEP recommended action/cleanup levels.

Two soil samples were also collected from drum storage areas where obvious spillage had occurred. One of the storage areas is located on the south side of the Warehouse Building. The sample collected from this location was analyzed for copper, lead, arsenic, zinc, mercury, pesticides and volatile organics. The concentrations of copper, zinc, mercury and total volatile organics (as well as benzene and methyl isobutyl ketone, individually) were above the NJDEP recommended action/cleanup levels. The second drum storage area where a sample was collected was located in the "yard area", however it is unknown exactly where the yard area is located within the site. The sample collected from this area was analyzed for copper, lead, arsenic, zinc, mercury and volatile organics. Only the level of mercury exceeded the NJDEP action/cleanup levels.

Since each of these four samples was labeled as a composite sample, the concentrations reported were probably lower than the actual concentration due to the dilution which occurs when samples are composited.

During the November 17, 1989 NJDEP/BPA Site Inspection, five soil samples were collected and analyzed for the TCL plus 30 peaks and PHCs. Soil-1S and Soil-1D were collected in the north-central portion of the site to the west of Pierson's Creek at depths of 8 to 10 inches and 16 to 18 inches, respectively. Both samples showed concentrations in excess of clean-up levels for volatile and semi-volatile organic compounds, numerous heavy metals and PHCs. The shallow sample showed consistently higher levels than the deep samples for the majority of contaminants detected. Soils 2 and 3 were also located in the north-central portion of the site but on the east side of Pierson's Creek, with Soil-2 being slightly to the north of Soil-3. Soil-2 was collected at a depth of 12 inches while Soil-3 was collected at 0 to 6 inches. Low, but detectable, levels of some semi-volatile organic compounds and pesticides were found in both samples. In Soil-2, lead (153 ppm), mercury (355 ppm) and PHCs (340,000 ppb) were detected above clean-up levels. Also above clean-up levels in Soil-3 were: lead (246 ppm), mercury (736 ppm) and PHCs (960,000 ppb). Soils-4 and 5 were collected along the southern border of the site. Soil-4, which was collected at a depth of 2.5 feet, showed detectable levels of semi-volatile organic compounds as well as elevated levels of barium (1320 ppm), copper (174 ppm), lead (3920 ppm), mercury (2590 ppm) zinc (1320 ppm) and PHCs (4,4000,000 ppb). Soil-5 was collected in the western portion of the site at a depth of 6 inches. Analysis revealed detectable levels of volatile organics and elevated levels of semi-volatiles, arsenic (55.7 ppm), barium (584 ppm), copper (185 ppm), lead (2840 ppm) mercury (210 ppm), zinc (1835 ppm) and PHCs (14,000,000 ppb). Complete results of all soil samples can be found on Table 11.

Sampling events over the years have confirmed widespread, extreme contamination of substances that can be directly attributed to Troy's processes such as copper, lead, zinc, mercury and benzene.

stated that there had been numerous explosions in Building 91 in the past.

Due to the nature (flammables, reactives, combustibles etc.) of materials used and stored by the company, a potential for future fires/explosions exists. Past inspections by the NJDEP revealed that extremely poor housekeeping practices employed by the company had permitted many chemicals to intermix. If similar conditions persist, which is likely, incompatible materials may mix resulting in potentially explosive and/or hazardous conditions.

OTHER CONSIDERATIONS

DAMAGE TO FLORA AND FAUNA

The deterioration of water quality in Pierson's Creek as a result of releases of hazardous substances may have a detrimental impact on aquatic biota in the creek. Aquatic organisms in Newark Bay may also be affected since Pierson's Creek discharges to the bay.

Migratory bird species are also susceptible to damage as the site lies along the flyway for many of the birds and hazardous substances, especially from spills and leaks, are easily accessible to the birds.

CONTAMINATION OF FOOD CHAIN

The presence of many bioaccumulative and biomagnification threats such as DDT, mercury and lead in soil, surface water and sediment leads to a potential for food chain contamination. The aquatic ecosystems of Pierson's Creek and Newark Bay appear to be the most susceptible to food chain contamination.

DAMAGE TO OFFSITE PROPERTY

The Albert Steel Drum/Prentiss Drug Site located directly north of Troy Chemical was recently acquired by the Newark Housing and Redevelopment Authority for redevelopment. During an investigation of the property by the Newark Engineering Department and the U.S. Attorney's Office on June 8, 1979, hundreds of bags labeled "Troysan-Mercury Acetate" were found strewn throughout the Albert Steel Drum/Prentiss Drug Site. The bags were reportedly empty (unused) but a silver gray material was observed on the ground surface in the vicinity of the bags. Samples of the silver gray material were collected and analysis revealed the presence of phenylmercuric acetate and high concentrations of mercury (0.5% or 5000 ppm). Since mercury and phenylmercuric acetate are major components of Troysan, it is likely the silver gray material was off-spec Troysan and was disposed of on the Albert Steel Drum/Prentiss Drug Site with excess container bags. It is probable other wastes from Troy Chemical were also disposed on the Albert Steel Drum/Prentiss Drug Site.

During many of the previous inspections at the Troy site by the USEPA and NJDEP, in which stream and/or sediment samples were collected from Pierson's Creek, background (upgradient) samples were collected from Pierson's Creek on the Albert Steel Drum/Prentiss Drug Site. Since many of the Troysan bags and the silver gray material observed on the Albert Steel Drum/Prentiss Drug Site were found near the drainage ditch (Pierson's Creek), it is questionable whether the upgradient samples actually monitor background conditions, as it appears Troy Chemical is at least partially responsible for upgradient (background) contamination.

In addition, the migration of contaminants offsite via Pierson's Creek may also have impacted downstream offsite properties.

CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs

As was previously stated, Troy Chemical was issued a sewer connection permit (#204013290) to discharge treated process wastewater, various blowdowns and sanitary sewage to the Passaic Valley Sewage Commission (PVSC) Treatment Plant. The discharge to PVSC is monitored continuously for LEL and pH as well as quarterly for BOD, TSS and petroleum hydrocarbons. The discharge was formerly monitored triweekly for mercury prior to the cessation of the mercury processes. This permit is in conjunction with the NJPDES permit by rule category which delegates regulatory responsibility for discharge to an approved Publically Owned Treatment Works (POTW) to the POTW itself. In addition, as per federal regulations, the POTW is required to develop an Industrial Pretreatment Program (IPP) ensuring contributor compliance with the POTW regulations. On numerous occasions Troy Chemical has exceeded limitations of these permits allowing contamination, including excessive quantities of mercury, to be discharged to the sewage system.

Prior to connection to the PVSC sewage system, process wastewaters were discharged to Pierson's Creek and sanitary wastes to the onsite septic tank/leach field system. The leach field system apparently also discharged to Pierson's Creek; however, Newark City ordinances prohibited the use of septic systems in areas serviced by sanitary sewers and New Jersey State Regulations prohibited the use of septic systems in flood prone areas. Since the company was in violation of both state and local regulations they were required to tie into the PVSC system. The exact date in which they were permitted to tie into the PVSC system is unknown; however, as early as March of 1977, a former Troy Chemical employee alleged that the company's newly installed septic tank was actually tied into the sanitary sewer system. The septic system reportedly had a cutoff valve which permitted wastes, including biocides and flammables to be discharged to the sanitary sewer system at will; however, these allegations could not be substantiated.

A sample of the discharge to the city sewer was collected by the NJDEP on September 1, 1977 and analyzed for iodine, mercury, zinc, chromium (hexavalent and total), sulfate, chlorides, volatile organics and a variety of indicator parameters including pH. Analysis of the sample revealed low concentrations of mercury, total chromium, lead and zinc and 17,400 ppm of chloride. The volatile organic analysis was postive for methylene chloride and carbon tetrachloride. The pH of the sample was 11.6, which is above the current sewage connection permit limitation; however, it is unknown what the permit limitation for this parameter was at the time of the incident.

On August 2, 1979, a discharge to the sewage system was again collected by the NJDEP. This sample was analyzed for volatile organics, mercury, total chromium, arsenic, and oil and grease. A field pH of this sample was reported to be over 12.0. Extremely high concentrations of benzene (1,350 ppb), tetrachloroethylene (1,368 ppb), 1,2-dichloroethene (19,250 ppb), and oil and grease (367 ppm) were detected in this sample. Low concentrations of total chromium and arsenic were also detected. Due to interference, the concentration of mercury in the sample could not be determined. Of greatest significance in this sample is the presence of volatile organics

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UNSTABLE CONTAINMENT OF WASTES

As previously addressed, waste management practices by the Troy Chemical Company, especially prior to 1986, have been inadequate and have contributed to soil, air, surface water and groundwater contamination. Many of these practices were referenced in previous sections and therefore will only be discussed briefly here.

Site conditions were best exemplified in various reports concerning inspections conducted by the NJDEP and the USEPA in the late 1970s and early 1980s. Although the numerous inspections spanned a period of greater than five years, overall site conditions remained relatively unchanged. Included in many of these inspection reports was reference to 4000 plus drums of wastes, raw materials and unknowns which were being stored throughout the site. Many of the drums were also reported to be in poor condition and were leaking. Since many of the drums were being stored on the unprotected ground surface, leaks and spills from the drums may have had a direct impact on soil contamination at the site.

In addition to the overall poor conditions of drums, tanks, etc. and the poor operational practices undertaken by the company, the inadequacy of secondary containment should also be considered. As was stated previously, many of the drums were stored on the unprotected ground surface, and even in areas where wastes were being stored on concrete or asphalt, berms were either non existent, inadequate or insecure to contain spills or leaks. Inspections had also revealed numerous cracks in the containment walls surrounding the tank farms and, in some instances, materials were observed leaking from the cracks. Numerous pipes were also observed throughout the site, many of which were leaking or discharging untreated wastes directly to Pierson's Creek. It should also be noted that reference was made to waste pits on site during an inspection by NJDEP personnel on June 6, 1977. The location and current status of these pits is unknown.

Another point worthy of consideration is the ultimate fate of the spills, leaks, drums, etc. which were removed for offsite disposal. In many cases, especially that relating to the removal of the 4,000 plus drums, the actual fate of the materials could not be determined due to conflicting reports concerning the removal and disposal. One report claims approximately 1,000 drums were hauled offsite for disposal by the Lightman Drum Company to Chemical Waste Management in early 1980. A report dated June 19, 1981 again states approximately 1,000 drums were removed by the Lightman Drum Company, but the disposal location was not reported. It is uncertain if these reports are actually addressing the same removal episodes. Yet still another report dated December 13, 1979 by Mr. Edward Faille of the NJDEP stated wastes from thousands of the drums were disposal via the PVSC, but the exact method of disposal was not specified. If the wastes were disposed in the sewage system, it is likely this represented an unpermitted illegal discharge as file reviews did not reveal any approvals from the PVSC for such disposal. The company claims that no manifests for the removal or disposal of any of these drums are available.

ILLEGAL/UNAUTHORIZED DUMPING

Known and suspected instances of illegal/unauthorized dumping were also addressed in previous sections and include the disposal of Troysan on the Albert Steel Drum/Prentiss Drug Site and those incidents observed on the aerial photography.

One alleged incident of illegal disposal which has not been referenced in previous sections occurred in the early 1980s and involved disposal of mercury wastes in the on site dumpster. Allegedly, mercury wastes were mixed with sand in 55-gallon drums and disposed of in the dumpster. Surveillance by the NJDEP, however, could not substantiate these allegations.

ENFORCEMENT ACTIONS

Numerous enforcement actions have been levied against the company resulting from violations of NJPDES, RCRA, air quality and local sewage commission regulations. A brief outline of some of the past regulatory/enforcement actions and the issuing agency is as follows:

- Issuing agency: NJDEP/Division of Hazardous Waste Management

August 19, 1987 - Amended Administrative Order and Notice of Civil Administrative Penalty Assessment (AAO/NCAPA)for failing to conduct semi-annual drills with local emergency response agencies and for failing to include in their contingency plan the emergency actions to be undertaken by facility personnel in case of releases of hazardous materials.

July 6, 1987 - Administrative Order and Notice of Civil Administrative Penalty Assessment (AO/NCAPA) for failing to arrange hazardous waste containers so the identification label is visible and for the violations referenced above The violation for failing to arrange the containers properly was later rescinded resulting in the Amended Administrative Order of August 19, 1987.

July 10, 1984 - Notice of Violation (NOV) for failing to submit a TSD annual report for 1983.

- Issuing agency: EPA

June 16, 1981 - Complaint, Compliance Order, and Notice of Opportunity for a Hearing regarding storage of ignitable waste without rendering them non-ignitable or protecting them from ignition; failing to operate the facility in a manner which would minimize the possibility of fires, explosions, releases, etc.; lacking adequate internal communication/alarm systems; and for failing to take precautions to prevent accidental ignition of ignitable wastes.

- Issuing agency: NJDEP/Division of Environmental Quality

June 14, 1984 - Notice of Prosecution (NOP) for failing to obtain a permit to construct, install or alter control equipment from the Department.

August 27, 1981 - Notice of Prosecution (NOP) for allowing benzene to be emitted into the atmosphere without registering the equipment with the Department.

June 25, 1981 - Notice of Prosecution (NOP) for utilizing three muffled mercury recovery furnaces, one of which was functioning improperly thereby permitting emissions to escape from the charging door.

March 26, 1981 - Notice of Prosecution (NOP) for using a recovery furnace without the Venturi Scrubber in use or functioning properly; and for failing to obtain a "Permit to Construct, Install or Alter Control Apparatus or Equipment" and a "Certificate to Operate Control Apparatus or Equipment" from the Department prior to installing/using a carbon adsorbtion unit.

July 14, 1980 - Notice of Prosecution (NOP) for using a mercury still and condenser without water service to the water layer emission reducer.

January 18, 1979 - Notice of Prosecution (NOP) for failing to obtain a "Permit to Construct, Install or Alter Control Apparatus or Equipment" prior to installing an 1800 gallon reactor.

July 10, 1978 - Notice of Prosecution (NOP) for failing to obtain a "permit" or "certificate" prior to installing/operating control equipment.

- Issuing agency: NJDEP/Division of Water Resources

June 28, 1987 - Directive Letter issued as a result of observations made during a Compliance Evaluation Inspection requiring Troy to cease unpermitted discharges of boiler blowdown water and steam condensate to Pierson's Creek, provide a timetable for implementation of a Best Management Practices Plan; and to inform DWR of any future spills through written notification.

February 24, 1987 - Thirty day notice for failure to submit a Discharge Monitoring Report.

March 27, 1986 - Thirty day notice for failure to submit a Discharge Monitoring Report.

June 21, 1985 - Directive Letter to correct deficiencies noted during a Compliance Evaluation Inspection. Deficiencies cited included violations of permit limitations for COD, poor housekeeping throughout the site, and the use of the company's lab to perform the NJPDES analysis however the lab was not certified for this analysis.

- Issuing agency: Passaic Valley Sewage Commission

May 9, 1986 - Numerous deficiencies were noted during a compliance inspection regarding the use of an LEL monitor which resulted in submission of a violation letter by the PVSC.

August 17, 1986 - Violation of PVSC rules and regulations for failing to submit a Baseline Monitoring Report.

August 13, 1986 - Numerous deficiencies were again noted in the company's Baseline Monitoring Report. Most of the deficiencies regarded improper reporting of various aspects of the Baseline Monitoring Report.

August 18, 1986 - Violation of PVSC Rules and Regulations by exceeding limitations of mercury on 59 of 60 occasions for the period spanning 4/1/86 to 6/30/86.

It should be noted that the ultimate result of many these enforcement actions is unknown. However, some of the actions were rescinded as a result of corrective actions taken by the company.

PRIORITY DESIGNATION
Becuase damage to human health or the environment is not likely due to the location of the site in a highly industrialized area, a low priolty is assigned.

RECOMMENDATIONS
If feasible, investigation of this site should be coordinated in conjunction with the RI/FS at the adjacent Albert Steel Drum/Prentiss Drug Site. It appears these two sites were actually part of one large operation for a long period of time and therefore many of the problems associated with both sites may be comparable. Additional sampling to determine the vertical and horizontal extent of contamination may be necessary.

Further investigation of the suspicious areas observed on the aerial photography is also necessary. Boring and/or sampling, as appropriate, is recommended for these areas. A full photographic interpretation should also be included to identify other areas of concern(i.e. the cesspool as referenced during the June 2, 1977 inspection and the waste pits referenced during the June 6, 1977 inspection).

The company should provide unambiguous information concerning the removal and ultimate fate of hazardous and potentially hazardous materials from the Troy facility from 1956 to date. This information should include, but not be limited to, the removal and disposal of spills, contaminated soils, sludges, process wastes (filter paper, residues, etc.) and the 4000 plus drums.

A definitive RCRA/IWMF status should be applied to the facility to address the gray areas currently present in the regulations including tank storage and secondary containment issues. Also, the NJDEP/Division of Hazardous Waste Management/Bureau of Environmental Evaluation and Cleanup Responsibility Assessment should be notified as to the cessation of the mercury processes in 1987 to determine if ECRA status is applicable.

Future inspections of the facility should address operational practices and equipment utilized by the company to ensure proper measures have been undertaken by the company to eliminate the occurrence of releases and spills. Secondary containment should also be upgraded or repaired in response to the insecure conditions noted during previous inspections by the NJDEP.

The company's current SPCC plan is totally inadequate as it does not address potential releases or spills from "non-oil" related storage areas. Because of the enormous quantities of hazardous materials stored on site and the numerous releases from the storage areas in the past, a plan addressing all storage areas is necessary. Secondary containment of the oil/solvent storage tank should also be taken into consideration although IWMF regulations do not require secondary containment for this type of unit.

Further development of the site, including the planned redirection of Pierson's Creek should be restricted until all environmental concerns have been addressed.

Due to the documented contamination of the soil, sediment surface water and groundwater by a variety of hazardous constituents, the lead for this case should be assigned to the Bureau of Case Management (BCM) with a Responisble Party search referred to the Bureau of Compliance and Technical Services (BCTS).

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Ed Frankel

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Hydrologic and Hydraulic Study
for the
Rehabilitation of Pierson's Creek

Prepared for:

City of Newark
Newark, New Jersey
Job No. 15752-002-175

2325 Maryland Road Willow Grove, PA 19090
(215) 657-5000

August 8, 1997

932250034

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(Continued)

932250036

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Surface Water

Arsenic	Cadmium	Lead
Mercury	Methylene Chloride	1,2-Dichloroethane
Benzene	Bis(2-ethylhexyl)phthalate	Carbon Tetrachloride
Chloroform	Tetrachloroethene	Trichloroethene
Vinyl Chloride	beta-BHC	Chlordane
Dieldrin		

Sediment

Arsenic	Cadmium	Lead
Mercury	2-Methylnapthalene	Acenapthene
Anthracene	Benzo(a)anthracene	Benzo(a)pyrene
Chrysene	Dibenz(a,h)anthracene	Fluoranthene
Dieldrin	Naphthalene	Phenanthrene
Pyrene	Chlordane	DDT
PCBs		

4.3.2 Troy Chemical Site (Stations 97+01 to 91+71)

The Troy Chemical Corporation, Inc. (Troy) Site is an operational chemical plant which is currently involved in a Memorandum of Agreement (MOA) with the NJDEP for the remediation of this site. Troy has manufactured specialty paint additives at this facility since 1956. Prior to 1956, the site was utilized by numerous industries including American Cyanamid/Calco, Heller and Merz, and Amalgamated Dyestuff and Chemicals for the manufacture of a variety of chemicals and dyes.

The additives manufactured (now or formerly) at the site are (or have been) used in the paint industry as preservatives, biocides, dryers, rheology agents (flow agents), surfactants, and dispersants. Reportedly the production of the various chemical additives are done almost exclusively through batch mixing and blending operations.

The information contained in the NJDEP file focused on the process schemes for organic fungicides, metallic soaps (drying agents) and mercury compounds. The file also indicated that facility routinely discharged process wastewaters, including untreated mercury bearing wastewaters, into Pierson's Creek until 1965. From 1965 to 1976, the mercury bearing wastewaters were treated by sulfide precipitation and discharged to the Passaic Valley Sewage Commission (PVSC); however, all other process wastewaters were still being discharged to the creek in untreated form. In 1976, an overall plant wastewater system was installed and treated wastewaters were routed to the PVSC. In 1977, Troy applied for a permit to discharge noncontact cooling water, boiler blowdown and condensates into Pierson's Creek. The permit was granted with an effective period from May 1978 to September 1980. In 1980, Troy renewed the permit through September 1990. The current status of Troy's discharge permit is not known as no further renewal information was available in the file.

According to information contained in the NJDEP's file, "the numerous samples have been collected by the NJDEP, the USEPA, and Wehran Engineering indicate that both permitted and unpermitted discharges by the company (Troy) have had a detrimental impact on surface water quality in Pierson's Creek." Furthermore, numerous enforcement actions have been levied against Troy. The agencies which issued these actions include the NJDEP - Division of Waste Management, US Environmental protection Agency (USEPA), NJDEP - Division of Environmental Quality, NJDEP - Division of Water Resources and the Passaic Valley Sewage Commission(PVSC). Sampling data contained in the NJDEP and City of Newark Municipal files indicate the presence of the following contaminants.

<u>Surface Water</u>

Arsenic	Beryllium	Cadmium
Chromium	Copper	Lead
Mercury	Nickel	Silver
Zinc	1,2-Dichloroethane	1,2-Dichloroethene
1,2-trans-Dichloroethylene	1,1,2,2-Tetrachloroethane	1,1,1-Trichloroethane
Benzene	Chlorobenzene	Chloroform
Dichlorobromethane	Ethylbenzene	Methylene Chloride
Tetrachloroethylene	Toluene	Trichloroethylene
Vinyl Chloride		

<u>Sediment</u>

Arsenic	Barium	Cadmium
Chromium	Copper	Lead
Mercury	1,2-Dichlorobenzene	1,2-Dichlorobenzene
1,4-Dichlorobenzene	1,1-Dichloroethane	1,1-Dichloroethene
1,2-Dichloroethene	2,3-Dimethylphenol	2-Methylnapthalene
2-Methylphenol	4-Methyl-2-pentanone	1,1,1-Trichloroethane
1,2,4-Trichlorobenzene	Acetone	Anthracene
Benzene	Bis(2-ethylhexyl)phthalate	Butylbenzylphthalate

Chlorobenzene	Chloroform	Chrysene
Diethylphthalate	di-n-Butylphthalate	di-n-Octylphthalate
Fluoranthene	Fluorene	Methylene Chloride
Naphthalene	Nitrobenzene	Phenanthrene
Pyrene	Tetrachloroethene	Toluene
Trichloroethene	Vinyl Chloride	Xylene
4,4'-DDD	4,4'-DDT	PCB Arochlor 1242
Petroleum Hydrocarbons		

4.3.3 Engelhard Corporation Site (Stations 86+05 to 75+01)

The Engelhard Corporation purchased and began to develop the site in 1952. Prior to 1952, the entire site was used as a municipal dump by the City of Newark. During the early 1950's, the northwestern corner of the site (away from the creek) was purchased by Cummins Diesel Company. Cummins operated a truck repair garage on the parcel until 1956, at which time Engelhard bought the property. Engelhard's operations have involved the refining of precious metals, research and the manufacturing of catalysts and other specialty chemicals. Radioactive materials were reportedly used at the site, however, radioactive wastes were reportedly not generated.

Limited operational information was available in the numerous environmental reports reviewed. However, information contained in the reports indicate that three 100,000-gallon, open top effluent holding tanks are alleged to have overflowed several times due to wind-related wave action. Two former drainage ditches (now paved over) received runoff, spillage, and discharges from process and reclaiming activities. The chemical sewer and pipe system of the facility is known to have had a number of releases. Transformers and capacitors containing PCBs are known to have leaked in at least five locations on-site. Two areas of the site are known to have been used for land disposal of potentially hazardous materials (photographic chemical sludge and contaminated dredge spoils from Pierson's Creek. Sampling data contained in the NJDEP and City of Newark Municipal files indicate the presence of the following contaminants.

<u>Sediment</u>

Arsenic	Cadmium	Chromium
Copper	Lead	Mercury
Nickel	Platinum	Silver
Thallium	Zinc	

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REMEDIAL INVESTIGATION ADDENDUM

TROY CHEMICAL CORPORATION, INC.

NEWARK, NEW JERSEY

Prepared for

Troy Chemical Corporation, Inc.

June 1998

Prepared by

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Project 83611-001.000

Remedial Investigation Addendum
Troy Chemical Corporation, Inc.

The material and data in this report were prepared under the supervision and direction of the undersigned.

EMCON

Tamara L. Sorell
Tamara L. Sorell, PhD
Project Manager

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Sample ID Date Sampled	NJ Surface Water Standard[1]	SW-01 5/14/97	SW-01 11/24/97	SW-04 5/14/97	SW-04 11/24/97	SW-08 5/14/97	SW-08 11/24/97	SW-09 5/14/97	SW-09 11/24/97
Inorganic Elements (ug/l)									
DL Multiplier			1		1		1		1
Aluminum	NA	486	U	272	U	503	U	122	U
Antimony	4300	U	U	U	U	U	U	U	U
Arsenic	0.136	**26**	U	U	U	**56**	**19.8**	**97**	**131**
Barium	2000	471	U	91	U	128	U	386	U
Beryllium	NA	U	U	U	U	U	U	U	U
Cadmium	0.363	**2.0**	U	**0.7**	U	**0.9**	U	U	U
Calcium	NA	300,000	44,000	26,800	27,500	37,500	30,500	76,000	56,500
Chromium	3230	U	2.3		2.8	U	4.5	U	7.8
Cobalt	NA	U	U	U	U	U	U	U	U
Copper	NA	72	8.1	U	17	U	23.4	U	54.6
Iron	NA	3290	1220	2240	1510	7260	2480	10,100	8510
Lead	NA	43	7.5	U	19.2	136	24.4	6	57.2
Magnesium	NA	3820	3130	4180	2880	7210	6150	12,000	4650
Manganese	100	**814**	**108**	**134**	75	39.4	**209**	**611**	**375**
Mercury	0.146	U	U	U	U	U	U	U	U
Nickel	3900	U	U	U	U	U	U	U	U
Potassium	NA	11,900	3750	4490	2000	6050	5100	17,600	9600
Selenium	NA	U	U	U	U	U	U	U	U
Silver	NA	U	U	U	U	U	U	U	U
Sodium	NA	4220	35,000	32,900	20,000	72,700	61,000	182,000	134,000
Thallium	6.22	U	U	U	U	U	U	U	U
Vanadium	NA	U	U	U	U	U	U	U	U
Zinc	NA	286	70	117	140	158	160	78	290
Field Parameters									
Temperature (°C)	NA[2]	15.9	4.60	15.20	9.25	15.3	5.28	14.6	6.24
pH	6.5-8.5	7.12	7.39	7.38	6.95	6.53	**6.44**	**6.30**	**6.43**
ORP (mV)	NA	15.2	192.0	27.6	189.7	17.0	224.5	26.5	221.2
Dissolved Oxygen (mg/l)	>3.0	11.20	4.84	**0.61**	3.82	**0.94**	5.02	**0.80**	4.57
Salinity (%)	NA	NA	0.21	NA	0.30	NA	0.46	NA	0.55

[1]Class SE3 waters.
[2]The site is not a heat dissipation area.

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Table 4
Troy Chemical RI/RAA
RI Addendum Report

Summary of Inorganics and Field Parameters in Surface Water

Sample ID Date Sampled	NJ Surface Water Standard[1]	SW-10 5/14/97	SW-10 11/24/97	SW-12 5/14/97	SW-12 11/24/97	SW-13 5/14/97	SW-13 11/24/97	Detection Limit 5/97	Detection Limit 11/97
Inorganic Elements (ug/l)									
DL Multiplier			1		1		1		
Aluminum	NA	1110	U	525	U	867	U	100	3000
Antimony	4300	U	U	U	U	U	U	8	5
Arsenic	0.136	**2380**	401	**2710**	7450	**206**	**14.1**	20	8
Barium	2000	219	U	334	U	467	U	20	500
Beryllium	NA	U	U	U	U	U	U	4	1
Cadmium	0.363	**5.8**	U	**2.7**	U	**1.8**	U	0.6	4
Calcium	NA	101,000	94,500	169,000	73,500	194,000	58,500	2000	250
Chromium	3230	U	3.9	U	6.1	21	3.2	20	2
Cobalt	NA	U	U	U	U	U	U	40	250
Copper	NA	194	20.6	U	45	61	19	40	5
Iron	NA	27,600	7210	11900	6210	12,500	461	100	25
Lead	NA	168	15.5	105	44.5	66	14.3	8	5
Magnesium	NA	18,700	16,000	16300	7230	22,700	10,000	2000	25
Manganese	100	**1150**	682	**808**	238	**2410**	37	10	25
Mercury	0.146	U	**1.67**	**5.2**	**14.3**	**2.5**	**12.4**	0.5	0.5
Nickel	3900	U	16.5	U	U	U	U	60	10
Potassium	NA	9800	8700	8420	3800	7530	6200	2000	100
Selenium	NA	U	U	U	U	U	U	8	8
Silver	NA	U	U	U	U	U	U	0.4	1
Sodium	NA	87,500	67,000	38.2	51,000	14,700	16,000	2000	50
Thallium	6.22	U	U	U	U	U	U	8	5
Vanadium	NA	U	U	U	U	U	U	30	25
Zinc	NA	494	110	226	190	254	90	20	20
Field Parameters									
Temperature (°C)	NA[2]	14.8	4.41	15.4	6.65	9.1	2.65	NA	NA
pH	6.5-8.5	**5.89**	**5.88**	6.87	7.14	6.64	6.76	NA	NA
ORP (mV)	NA	45.5	229.3	1.9	190.0	16.6	182.7	NA	NA
Dissolved Oxygen (mg/l)	>3.0	**0.76**	3.16	**0.86**	3.06	**1.36**	6.67	NA	NA
Salinity (%)	NA	NA	0.48	NA	0.41	NA	0.22	NA	NA

[1]Class SE3 waters.
[2]The site is not a heat dissipation area.

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Table 6
Troy Chemical RI/RAA
RI Addendum Report

Summary of Inorganics and Field Parameters in Groundwater

Sample ID	NJ Class IIA	MW-1				
Date Sampled	Groundwater	Total		Dissolved		Low Flow
	Criterion[1]	11/19/96	5/14/97	11/19/96	5/14/97	11/26/97
Inorganic Elements (ug/l)						
Aluminum	200	11,200	3000	U	U	U
Antimony	20	U	U	U	U	U
Arsenic	8	1320 J	840	887 J	690	819
Barium	2000	484	467	342	330	U
Beryllium	20	U	U	U	U	U
Cadmium	4	U	1.3	U	U	U
Calcium	NA	104,000	133,000	101,000	113,000	89,000
Chromium	100	150 J	57	U	U	5
Cobalt	NA	U	U	U	U	U
Copper	200	U	U	U	U	U
Iron	300	32,300	36,900	18,500	20,300	13,600
Lead	10	216 J	27.2	U	U	U
Magnesium	NA	28,800	30,300	28,600	28,000	21,300
Manganese	50	2,030	2,440	1,580	1,630	1,340
Mercury	2	1,300 J	3.5	1.0 J	U	2
Nickel	100	U	U	U	U	U
Potassium	NA	26,000	18,600	24,800	17,900	14,900
Selenium	50	U	U	U	U	U
Silver	NA	U	U	U	U	U
Sodium	50,000	89,400	119,000	93,000	117,000	116,000
Thallium	10	U	U	10.3	U	U
Vanadium	NA	U	34	U	U	U
Zinc	5000	441 J	270	U	29	91

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Table 6
Troy Chemical RI/RAA
RI Addendum Report

Summary of Inorganics and Field Parameters in Groundwater

Sample ID / Date Sampled	NJ Class IIA Groundwater Criterion[1]	MW - 3 Total 11/19/96	MW - 3 Total 5/14/97	MW - 3 Dissolved 11/19/96	MW - 3 Dissolved 5/14/97	MW - 3 Low Flow 11/26/97
Inorganic Elements (ug/l)						
Aluminum	200	4370	3730	U	U	U
Antimony	20	U	U	U	U	U
Arsenic	8	343 J	540	401 J	670	350
Barium	2000	U	211	U	124	U
Beryllium	20	U	U	U	U	U
Cadmium	4	U	U	U	U	U
Calcium	NA	69,000	81,400	66,700	74,000	59,500
Chromium	100	66.1 J	73	U	U	5
Cobalt	NA	U	U	U	U	U
Copper	200	U	U	U	U	U
Iron	300	18,800	22,500	10,400	10,200	10,100
Lead	10	155 J	17.3	U	U	U
Magnesium	NA	8960	9030	8340	8390	7,330
Manganese	50	733	788	614	630	445
Mercury	2	2040 J	8.4	1.1 J	U	12
Nickel	100	U	U	U	U	U
Potassium	NA	11,800	10,400	11,000	10,100	8,700
Selenium	50	U	U	U	U	U
Silver	NA	U	U	U	U	U
Sodium	50,000	72,000	124,000	71,900	116,000	108,000
Thallium	10	U	U	10.4	U	U
Vanadium	NA	U	U	U	U	U
Zinc	5000	239 J	205	31.4 J	48	51

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Table 6
Troy Chemical RI/RAA
RI Addendum Report

Summary of Inorganics and Field Parameters in Groundwater

Sample ID / Date Sampled	NJ Class IIA Groundwater Criterion[1]	MW - 4				
		Total		Dissolved		Low Flow
		11/19/96	5/14/97	11/19/96	5/14/97	11/26/97
Inorganic Elements (ug/l)						
Aluminum	200	7630	3870	U	U	U
Antimony	20	U	U	U	U	U
Arsenic	8	U	11	25.8 J	6	19.7
Barium	2000	355	213	210.	104	U
Beryllium	20	U	U	U	U	U
Cadmium	4	U	0.7	U	U	U
Calcium	NA	177,000	164,000	155,000	146,000	180,000
Chromium	100	33.2 J	27	U	U	4
Cobalt	NA	U	U	U	U	U
Copper	200	U	U	U	U	19
Iron	300	**18,900**	**14,500**	**3050**	**2120**	**6,180**
Lead	10	577 J	**105**	U	U	**43**
Magnesium	NA	17300	11300	15000	10100	12,900
Manganese	50	**1060**	**631**	**759**	**458**	**549**
Mercury	2	2460 J	U	U	U	U
Nickel	100	U	U	U	U	U
Potassium	NA	50,600	21,100	47,600	20,900	10,000
Selenium	50		U	U	U	U
Silver	NA		U	U	U	U
Sodium	50,000	**152,000**	**310,000**	**158,000**	**308,000**	**392,000**
Thallium	10	**11.5**		U	U	U
Vanadium	NA	104	71	U	U	U
Zinc	5000	503 J	305	U	43	93

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Table 6
Troy Chemical RI/RAA
RI Addendum Report

Summary of Inorganics and Field Parameters in Groundwater

Sample ID	NJ Class IIA	MW - 5											Detection/Quant. Limits		
Date Sampled	Groundwater	Total				Dissolved				Low Flow			11/96	5/97	11/97
	Criterion[1]	11/19/96		5/14/97		11/19/96		5/14/97		11/26/97					
Inorganic Elements (ug/l)															
Aluminum	200	11700		506			U	114			U		200	100	3000
Antimony	20		U	9.59			U		U		U		60.0	8	5
Arsenic	8	74.3	J	36		74.7	J	7.2		102			10.0	4	8
Barium	2000	1110		881		876		1,070			U		200	20	500
Beryllium	20		U		U		U		U		U		5.0	4	1
Cadmium	4		U	0.7			U		U		U		5.0	.6	4
Calcium	NA	182,000		176,000		171,000		168,000		138,000			5000	2000	250
Chromium	100	60.7	J		U		U		U	14			10.0	20	2
Cobalt	NA		U		U		U		U		U		50.0	40	250
Copper	200		U	99			U	48			U		25.0	40	5
Iron	300	26,600		7360		14,000		1,780		8,520			100	100	25
Lead	10	97.8	J	14.4			U		U		U		3.0	4	5
Magnesium	NA	20200		18,500		20,400		15,500		12,400			5000	2000	25
Manganese	50	853		775		744		708		466			15.0	10	25
Mercury	2	28.4	J		U		U		U		U		0.20	.5	1
Nickel	100		U		U		U		U		U		40.0	60	10
Potassium	NA	124,000		69,600		120,000		69,700		64,000			5000	2000	100
Selenium	50		U	8.96			U		U		U		5.0	8	8
Silver	NA		U	1.2			U		U		U		10.0	0.4	1
Sodium	50,000	106,000		2,120,000		108,000		2,930,000		3,000,000			5000	2000	50
Thallium	10	12.0			U		U			10			10.0	8	5
Vanadium	NA	63.6		88			U	125		118			50.0	30	25
Zinc	5000	398	J	454		24.9	J	246		40			20.0	20	20

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REMEDIAL INVESTIGATION REPORT FOR ADDITIONAL SOIL AND GROUND WATER SAMPLING AND REMEDIAL ACTION SELECTION REPORT FOR SOIL TROY CHEMICAL CORPORATION, INC.

for the Property Located at One Avenue L
Newark, New Jersey

Prepared for:

Troy Chemical Corp., Inc.
Newark, New Jersey

September 27, 2000

Prepared by:

Environmental Liability Management, Inc.
218 Wall Street
Research Park
Princeton, NJ 08540-1512

Michael J. Firth
Project Manager

Peter P. Brussock, Ph.D., P.G.
Vice President

Reviewed by:

Joseph R. Fallon, R.E.M.
President

elm

CERTIFICATIONS
N.J.A.C. 7:26E-1.2, *et seq.*

Any person making a submission to the Department required by this chapter and pursuant to N.J.A.C. 7:26E shall include the following signature and notarized certification, for each technical submittal. Additionally, the certification shall indicate the case name and address, case number, type of documents submitted, e.g., Remedial Action Report, for each technical submittal.

TYPE OF DOCUMENT Remedial Investigation Report/Remedial Action Selection Report

CASE NAME Troy Chemical Corporation, Inc.

CASE ADDRESS One Avenue L, Newark, NJ 07105

CASE NUMBER

The following certification shall be signed by:

1. For a corporation; by a principal executive officer of at least the level office of vice president;
2. For a partnership or sole proprietorship, by a general partner of the proprietor, respectively, or;
3. For a municipality, State, Federal or other public agency, by either a principal executive officer or ranking elected official.
4. For persons other than 1 through 3 above, by the person with legal responsibility for the site.

"I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, to the best of my knowledge, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement that I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties."

PRINTED NAME William Rudloff TITLE V. PRES. -OPER.

SIGNATURE [signature] DATE 9-15-00

NOTARY SIGNATURE Margaret Lejins DATE 9-15-00

NOTARY PUBLIC NEW JERSEY

MARGARET LEJINS-PITTA
A Notary Public of New Jersey
My Commission Expires 10/31/04

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EXECUTIVE SUMMARY

The Troy Chemical Corporation, Inc. (Troy) is conducting a remedial investigation (RI) of its active chemical manufacturing facility located at One Avenue L, Newark, Essex County, New Jersey (Figure 1). The property has a long history of industrial operations under numerous owners and is located in an area of similar industrial-use properties surrounding the Troy facility, including the Albert Steel Drum/Prentiss Drug Superfund Site.

The RI is being conducted pursuant to a Memorandum of Agreement (MOA) with the New Jersey Department of Environmental Protection (NJDEP). The results from soil and ground water (shallow and deep) investigations completed during this phase of the RI supplement the data collected from previous investigations completed under the MOA, including soil, ground water, surface water and sediment sampling and analyses (Emcon. 1998a, 1998b). The most recent investigations included soil and ground water sampling consistent with the "Remedial Investigation Workplan for Additional Soil and Ground Water Sampling (RIW) (ELM. 1999)" approved by the NJDEP in a letter dated January 24, 2000. The RIW was developed following the agreement with the NJDEP that, due to the site history and constraints associated with current buildings and operations, a general site-wide characterization could be implemented as part of additional activities required to comply with the Technical Requirements for Site Remediation (N.J.A.C. 7:26E, *et seq.*).

The RI results provide a sufficient database to evaluate the distribution of site-related constituents in soil. An evaluation of the data supports the conclusion that many of the constituents detected can be attributed to historic fill used during the site development. Three primary constituents that may be related to site-operations included benzene, lead and mercury. These constituents were detected at the highest concentrations in AOCs 1, 5, 6 and 10. In some soil samples the concentrations of lead and mercury were very high (lead up to 61,000 mg/kg and mercury up to 4,000 mg/kg); however these concentrations are limited in areal extent and depth, and the data do not support that these concentrations represent a significant source to ground water. Based on the current and future use of the property, a remedial alternatives analysis was conducted for soil considering: (1) No Action;

(2) Maintenance of the existing property cover with institutional controls; and (3) Hot spot removal with institutional controls and maintenance of the existing property cover. Following the comparison of each alternative based on the selection criteria, Troy proposes to maintain the existing cover and complete a deed notice as an additional institutional control. This alternative minimizes the potential for future direct contact with site-related constituents in soil, limits the potential for transport of constituents from soil to ground water and is protective of human health and the environment.

The ground water investigation included evaluation of the shallow ground water, the deep ground water and the inter-relationship between the two primary water-bearing units. Based on water elevation measurements in three monitoring well clusters (MW-2, MW-4 and MW-6), there is a downward head. However, the low permeability of peat layer limits downward movement, and ground water elevations indicate potential discharge of the shallow ground water into Pierson's Creek. The primary constituents of concern in ground water are benzene, tetrachloroethene and trichloroethene. The inorganics (e.g., lead and mercury) are a much lesser concern based on the concentrations detected in the shallow ground water using low flow sampling techniques. For the deep ground water, mercury was not detected above NJDEP ground water quality standards (GWQS), as previously measured during sampling during the 1980s. Tetrachloroethene and trichloroethene were detected in the deep ground water monitoring wells, with the highest concentrations detected in MW-2D, and the concentrations detected in MW-4D supporting a conclusion that an off-property source is present.

For ground water, Troy will document a Classification Exception Area following review of ground water quality data for upgradient, off-property sources of ground water contamination.

DISCLAIMER

Environmental Liability Management, Inc. (ELM) prepared this report based upon the review of materials and communications listed in the text and appended material. The report was prepared for the exclusive use of Troy Chemical Corp., Inc. for specific application to the subject property. No other warranty, express or implied, is made. ELM does not purport to give legal advice. Any reference to legal issues or terms is provided as part of the general environmental risk assessment and is not a substitute for the advice of competent legal counsel.

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1. INTRODUCTION

The Troy Chemical Corporation, Inc. (Troy) is conducting a remedial investigation (RI) of its active chemical manufacturing facility located at One Avenue L, Newark, Essex County, New Jersey (Figure 1). The Troy property has been used for industrial operations dating back prior to 1892. Similar industrial-use properties surround the Troy facility, including the Albert Steel Drum/Prentiss Drug Superfund Site.

The RI is being conducted pursuant to a Memorandum of Agreement (MOA) with the New Jersey Department of Environmental Protection (NJDEP). Previous investigations -- including soil, ground water, surface water and sediment -- were completed under the MOA. The results of those investigations were summarized in the "Remedial Investigation Report (Emcon. 1998a)" and the "Remedial Investigation Addendum (Emcon. 1998b)".

The most recent investigations included soil and ground water sampling consistent with the "Remedial Investigation Workplan for Additional Soil and Ground Water Sampling (RIW) (ELM. 1999)" approved by the NJDEP in a letter dated January 24, 2000. The RIW was developed following a meeting between Troy and the NJDEP on September 14, 1999. During the meeting, the NJDEP agreed that, due to the site history and constraints associated with current buildings and operations, a general site-wide characterization could be implemented as part of additional activities required to comply with the Technical Requirements for Site Remediation (N.J.A.C. 7:26E *et seq.*). The general site-wide characterization would provide adequate coverage of the property to evaluate potential risks and remedial options.

The results of the additional site-wide characterization were evaluated in conjunction with data previously collected. Based on the evaluation, a Remedial Alternatives Analysis (RAA) was completed for soil.

2. BACKGROUND

2.1. Environmental Setting

The Troy facility is an active manufacturing facility on approximately 5.8 acres primarily covered by buildings and concrete (Figure 2) (areas not covered by buildings or concrete are landscaped areas beyond any industrial operations). The property is located in a heavy industrialized area and is adjacent to the Albert Steel Drum/Prentiss Drug Superfund Site. Municipal water is supplied to all properties within at least two miles of the site.

Many of the surrounding industrial properties have well documented environmental contamination, including soil and ground water contamination. The regional distribution of ground water contamination can be observed by the noticeable green-pigment coloration of shallow ground water and surface water within Pierson's Creek. During excavation activities on adjacent properties, substantial volumes of green-colored storm water runoff have been observed discharging into Pierson's Creek downstream of the Troy facility. The green pigment is attributable to operations at the Calco Chemical Company (part of American Cyanamid) facility on an adjacent property prior to 1956.

The property is located within the Central Newark Basin Physiologic Province. Beneath the concrete and buildings are several unconsolidated strata (Figure 4). The uppermost strata is historic fill material. Beneath the fill is a layer of marsh deposits comprised of silts and peats, occurring at approximately 9 to 11 feet below ground surface. Below the peat layer are stratified deposits of sands and silts which overlie glacial till.

Two principal water bearing units, both of which meet the definition of an aquitard under NJDEP regulations (N.J.A.C. 7:9-6.4 and N.J.A.C. 7:9-6.5), are present. The water table in the upper unit is approximately 2 to 5 feet below ground surface, while a deeper aquifer is encountered below the peat layer (9 to 11 feet below ground surface). Ground water flow in the shallow aquifer is variable, but always toward Pierson's Creek in the center of the property, while the flow in the deep aquifers is generally southeasterly. The horizontal hydraulic gradient in the shallow aquifer was measured to be 0.01 ft/ft, while in the deeper aquifer the horizontal hydraulic conductivity was measured to be 0.06 ft/ft (Emcon. 1998a). These gradients are low to moderate and indicate a relatively slow ground water flow. The overburden materials have a low permeability (approximately 10^{-7} cm/sec hydraulic conductivity) (Emcon. 1998a), indicating a relatively slow ground water flow. These hydraulic conductivities are characteristic of an aquitard (less than 0.1 ft/day) (N.J.A.C. 7:9-6.4, 7:9-6.5), making the ground water in these water-bearing units unsuitable as a potable supply.

The property is divided by Pierson's Creek, a man-made drainage ditch that conveys water toward the south where it discharges into Newark Bay through two tide gates at Port Newark Channel. Pierson's Creek is a component of the City of Newark's storm water system, conveying storm water from approximately 775 acres of urban and industrial land (Dames & Moore. 1998). The base of the creek is typically at mean sea level with a slight hydraulic gradient of up to 0.2% (Dames & Moore. 1998). The Pierson's Creek channel originates at Wilson Avenue, on the Albert Steel Drum/Prentiss Drug Superfund Site.

A second man-made ditch is along the eastern property boundary. This ditch drains into Pierson's Creek along the southern property boundary.

2.2. Site Operational History

The Troy property has a long operational history of numerous industrial and manufacturing activities, beginning prior to 1900 and continuing to present. Historical information was obtained from a review of historical drawings such as Sanborn Fire Insurance Maps and aerial photographs. The operational history was supplemented with information obtained from interviews with Troy employees (Emcon. 1998a).

2.2.1. Property Owners and Operators

A brief synopsis of the property ownership is provided below.

- 1892 to 1931 - Property owned and operated by Heller and Merz Company, a manufacturer of dyes and colors. At that time, the total property included the property currently owned by Troy as well as the property currently known as the Albert Steel Drum/Prentiss Drug (ASD/PD) site. Prior to 1900, the western border of property was tidal marsh.

- 1931 to 1953 - Calco Chemical Company operated on the property.

- 1953 to present – Troy Chemical Corporation owned and operated on the property.

2.2.2. Troy Operations

A brief review of the changes in Troy's operations over time is summarized below (Figure 3; Table 1). More detail is provided in the "Remedial Investigation Report (Emcon. 1998a, Chapter 2)":

- 1953 – Troy operations included metallic soaps (Building 91) and powder blending (Building 56)

- 1957 – Manufacture of metal-containing products initiated. Inorganics such as cobalt (Co), copper (Cu), lead (Pb) and mercury (Hg) were used.

- 1960s – An oil/water separator was installed in the late 1960s/early 1970s in the central portion of the property. All oil was disposed off-site by a licensed hauler. The oil/water separator was removed in the 1970s.

- 1963 – Laboratory (Building 99) and office (Addition to Building 91) buildings were constructed.

- 1965 (approx.) – A closed-pipe mercury treatment system was constructed.

- 1968 to 1970 – Additional mercury-containing products were being manufactured.

- 1971 – Mercuric oxide manufacturing near Building 56 was discontinued. Manufacture of mercuric oxide and dryers were initiated in Building 40.

- 1974 to 1980 – Mercury recovery stills were operated adjacent to where Building 35 was previously located.

- 1975 – Entire site was connected to Passaic Valley Sewerage Commission. This provided for the removal of the septic system operation near Building 99.

- 1976 (approx.) – Building 71 was constructed and used for fungicide manufacturing. The boiler and maintenance shop was also constructed.

- 1976 (approx.) – Warehouse building was constructed. This building is currently part of the office building that was constructed in 1984.

The Troy facility has on-going manufacturing of numerous chemicals, along with laboratories, warehouses and offices. The active industrial use of the property will continue into the future.

Based on this history, Areas of Concern (AOCs) were identified and investigated. The initial RI investigations included five AOCs, while an additional seven AOCs were investigated as part of the most recent sampling event.

2.3. Project History

Several phases of environmental investigations have been conducted at the Troy Chemical. These investigations have included sampling of soil, ground water, sediment (from Pierson's Creek and its tributary), and surface water. These investigations have been summarized in numerous reports (Emcon. 1998a, 1998b). A detailed review of the site history and operations was previously submitted to the NJDEP [Remedial Investigation/Remedial Alternative

Analysis Workplan Addendum, Quality Assurance Project Plan Addendum, Health and Safety Plan Addendum (Emcon. 1996); Remedial Investigation Report (Emcon. 1998a)].

Based on the site history and historic analytical results for ground water and soil, five AOCs were initially identified (Figures 2 and 3) and investigated.

- **AOC 1** – The vicinity of the former mercury recovery still located in the southeastern corner of the site that operated in the 1970s. This unit also operated as a toll facility for the nearby Engelhard Industries plant.

- **AOC 2** – The vicinity of the former mercury treatment system to the west of Building 56.

- **AOC 3** – The vicinity of the former septic tank on the eastern side of the site.

- **AOC 4** – The vicinity of historical soil samples 1S and 1D collected in the early 1980s, just west of Pierson's Creek in the northern portion of the site.

- **AOC 5** – The vicinity of soil sample 4S (historical sample with limited documentation) on the southern border of the property where mercury was detected in soil at over 2,000 mg/kg.

2.3.1. Soil Data

Two primary soil investigations have been completed for the Troy property. In 1988, Wehran Engineering (Wehran) and the NJDEP collected split-soil samples from several soil borings during November 1988. Soil samples collected during this investigation contained lead at concentrations up to 3,910 mg/kg and mercury at concentrations over 2,000 mg/kg. Low concentrations of organic constituents were detected. The results of these early investigations were previously summarized (Emcon. 1998a).

Additional soil sampling was conducted during 1996 when five shallow monitoring wells were installed in AOCs 1-5 (Table 2). As discussed in the "Remedial Investigation Report (Emcon. 1998a)," only a few organic constituents were detected at concentrations exceeding the NJDEP soil cleanup criteria. Benzene was detected in the 0-2 foot depth interval of TB-1 (3 mg/kg) above the NJDEP impact to ground water criterion (1 mg/kg). Fluorene was also detected in TB-1 (13 mg/kg) slightly above the NJSCC impact to ground water criterion (10 mg/kg). Inorganic constituents were also detected at concentrations exceeding NJSCC, primarily including arsenic, lead and mercury. Other inorganic constituents were detected sporadically across the property.

2.3.2. Ground Water Data

In 1981 ground water monitoring wells were installed; however, these were not part of the Remedial Investigation and only minimal records exist about these wells. Although the monitoring wells no longer exist, ground water samples from 1981 and 1982 contained volatile organic constituents (i.e., benzene, tetrachloroethene, trichloroethene, etc.) at concentrations above current ground water standards. Inorganic constituents were also detected above ground water standards, most notably mercury in MW-2A (mercury concentrations ranged from 0.08 to 25.3 mg/l between 1981 and 1988), a monitoring well that was screened in the glacial till below the peat layer. According to historic figures, MW-2A is in close proximity to MW-4 that was installed in 1996.

Five monitoring wells were installed in 1996 by Emcon. Ground water sampling from these wells was conducted for five events between November 1996 and July 1999. Beginning with the November 1997 round, ground water sampling was conducted using low-flow sampling techniques. The low-flow sampling results show that only minimal contamination is related to inorganic constituents and that previously elevated constituent concentrations were caused by high turbidity. Based on an evaluation of the total compared to dissolved concentrations during the November 1996 and May 1997 sampling events and the results from the low-flow sampling techniques during November 1997, November 1998 and July 1999, the dissolved and potentially mobile fraction of inorganic constituents is substantially lower than the total concentrations (Emcon. 1998b). The primary VOCs detected above ground water quality standards (GWQS) were benzene, chloroethane, 1,1-dichloroethene, 1,1,1-trichloroethane, trichloroethene, and tetrachlorethene (Emcon. 1998a, 1998b). The chlorinated organic constituents were only consistently detected in MW-2.

3. CONCEPTUAL SITE MODEL

There are limited potential exposure pathways on the property under current operating conditions, as illustrated on a conceptual site model (Figure 5). The property is currently an active manufacturing facility that is covered by concrete, asphalt and buildings. As a result, workers are not exposed to any site-related constituents in the historic fill material or soil. Regional ground water contamination is well-documented and ground water is not used on the Troy property or adjacent properties currently or planned for use at any time in the future.

The two principal saturated soil units, shallow and deep, have different potential flow paths and receptors. The shallow ground water is not currently or likely to ever be used for any purposes, due to its low hydraulic conductivity. The primary soil matrix in the shallow water bearing unit is historic fill material. Although the shallow ground water is underlain by a peat layer, there tends to be a slight downward head toward the deeper glacial till water-bearing unit. Based on an evaluation of water table elevations, ground water flow directions (Figures 6-8) and surface water elevations in Pierson's Creek, shallow ground water is predicted to discharge into the creek. Based on the low hydraulic conductivity and low gradients, the rate of any discharge into the creek would be low.

The peat layer and associated silts and clays limit the downward transport from the shallow ground water unit to the underlying deep aquifer. In addition, the high organic content of the peat layer attenuates both organic and inorganic constituents through adsorption and cation exchange. In the deeper water-bearing unit, substantially lower constituent concentrations have been detected. Deep ground water flows toward Newark Bay (Figure 8) and, based on the water elevation measurements in the deep monitoring wells compared to the shallow monitoring wells, there is a downward head. As a result, the deeper ground water is not predicted to discharge to Pierson's Creek, thereby facilitating substantial attenuation prior to reaching Newark Bay. Because the Troy property is in an area of discharge near Newark Bay, ground water from within the bedrock below the property would be predicted to have an upward head, reducing the potential for transport from within the glacial till to the bedrock. No potable users have been identified downgradient of the site (see well search results, Attachment A), and none is projected in the future, as municipal water is supplied from abundant surface water sources.

Based on the conceptual site model, no direct exposures are predicted for human or ecological receptors on the property, except as related to Pierson's Creek. This is consistent with previous interpretations of data collected during other environmental investigations. For the creek, the RI soil and ground water data were evaluated to determine if any potential sources exist that continue to adversely affect shallow or deep ground water quality in a manner that would adversely affect sediment and surface water in Pierson's Creek and to determine the most appropriate approach for continuing the investigation of Pierson's Creek.

4. REMEDIAL INVESTIGATION

4.1. Objectives

The soil and ground water sampling was conducted to collect additional data necessary to support the development of a Remedial Alternatives Analysis and Remedial Action Selection Report for soil and ground water. Based on the existing data (Emcon. 1998a, 1998b), the primary COCs for both soil and ground water included:

- Mercury
- Lead
- Arsenic (related to historic fill)
- Benzene

- Chlorinated solvents (possibly related, in part, to an upgradient Superfund Site)

The additional RI sampling was conducted to:

- Determine the horizontal and vertical distribution of site-related COCs;

- Evaluate whether mercury concentrations previously measured in soil will continue to be transported to ground water above concentrations of concern for the site;

- Evaluate the physical and chemical characteristics of the peat layer present approximately 9 to 11 feet below ground surface, and evaluate how the peat layer affects the fate and transport of site-related COCs;

- Measure physical and chemical parameters in the soil and ground water that control the fate and transport of mercury and other COCs to support a weight-of-evidence evaluation of the potential for off-site transport of the COCs and to support the evaluation of remedial actions; and

- Collect additional soil and ground water data to assess the distribution of site-related COCs and evaluate remedial alternatives.

The data collected during this investigation support the selection of remedial actions for soil and ground water that provide the highest net environmental benefit while considering the current industrial facility operations and constraints, as well as the industrial regional context of the facility and non-potable use of ground water in the region.

4.2. Identification of Additional AOCs

As part of the RI, the site operating history was re-evaluated (Section 2.2), to determine if additional areas of the site should be considered as potentially distinct AOCs. Seven additional AOCs were identified for investigation (Figures 2-3):

- **AOC 6** – Building 20 was constructed in 1976 and used as a warehouse. This AOC was investigated because of its use to store materials. Sampling of this area also increased the site characterization data for the northwestern portion of the property.

- **AOC 7** – Buildings 30 and 30a were constructed in 1976 and 1986, respectively. These buildings are used for the boiler as well as maintenance shops. A sump is located adjacent to these buildings.

- **AOC 8** – Building 40 was historically used to manufacture dryers and mercuric oxide in the 1970s.

- **AOC 9** – Building 71 was constructed in 1976 (approximately) and was used for fungicide manufacturing.

- **AOC 10** – Building 81 was constructed in approximately 1970 for use as a warehouse. Previous sampling (1S and 1D) adjacent to this Building contained mercury and lead at concentrations that exceeded the NJDEP soil cleanup criteria for restricted use.

- **AOC 11** – The process sewer line conveys waste water through the central portion of the facility. There is no evidence or report of leaks associated with the process sewer line.

- **AOC 12** – Building 61 (Bactericide and Defoamer Manufacturing), located in the southwestern portion of the property. No soil samples were previously collected in this portion of the property.

The investigation of these areas, along with previously collected data, provides a database that can be used to evaluate the existing environmental conditions and develop a property-wide risk management alternative that is protective of human health and the environment. Due to the constraints associated with the current buildings, there are no other areas that can be investigated.

4.3. Remedial Investigation Activities

The remedial investigation activities completed during this phase were:

- Installed seven monitoring wells (Figure 2; Table 3), including one additional shallow well (less than 10 feet deep), three wells screened within the peat layer, and three deep wells screened within the glacial till beneath the peat layer (approximately 50 to 60 feet below ground surface). These wells were installed to collect ground water quality data to evaluate the deep ground water-bearing unit to confirm or refute previous elevated mercury concentrations in monitoring well B-2A (no longer in service) and to collect data necessary to evaluate the fate and transport of site-related constituents between the shallow and deep water bearing units;

- Collected five soil samples from each deep monitoring well during installation to obtain data from near surface, above ground water table, above the peat layer, within the peat layer and below the peat layer. These data were used to evaluate vertical constituent concentrations trends relative to the adsorptive characteristics of the peat layer;

- Collected two soil samples from each of 17 boring locations (Figure 2) to collect data to characterize additional AOCs, to expand the site-wide data set for evaluating horizontal and vertical concentration trends within the upper-most portion of the shallow fill material, and to determine if any potential constituent concentrations may pose an unacceptable impact on shallow ground water;

4.3.1. Monitoring Well Installation

Seven additional monitoring wells were installed between March 28 and April 3, 2000 by Summit Drilling Company, Inc. (well logs are provided in Attachment B). The wells were installed to establish well clusters (MW-2/2P/2D, MW-4/4P/4D, and MW-6/6P/6D) in three locations on the property (Figure 2), so that at each location there would be a shallow well screened in the fill material above the peat layer, a peat well and a deep well screened in the glacial till below the peat layer. By screening a well within each of these geologic units, the ground water quality within each unit was evaluated and the data necessary to evaluate the potential interactions between the shallow and deep ground water were collected.

The deep wells were installed using a hollow-stem auger with continuous split spoons to observe the stratigraphy and so that soil samples could be collected. The three deep wells were triple cased, with the outer casing (10") set within the peat layer and the middle casing (6") set within a silt layer below the peat layer. The 2" well was then drilled to the specified depth (50 to 60 feet bgs). The shallow well was also installed using the hollow-stem auger, while the peat layer wells were installed using a hurricane rig. All wells were flush mounted. All wells were developed to minimize the sediment in the well water and establish a clear connection with the formation.

4.3.2. Ground Water Sampling

Ground water sampling was conducted on May 3, 2000 by Terra-Nova Technical, Inc. NJDEP personnel were on-site to observe the sampling. Ground water samples were collected using low-flow techniques, as documented by Terra-Nova Technical, Inc. (Attachment D, includes description of sampling and field data sheets). Analyses were conducted consistent with the NJDEP-approved RIW (ELM. 1999), except that MW-6P parameters were limited due to extremely slow recharge (Table 4). The ground water sample for MW-4D was turbid, even with the low-flow sampling techniques; as a result, a filtered sample was collected for analysis of inorganic constituents.

In addition to the laboratory analyses, several field parameters (pH, dissolved oxygen, redox) were measured during the sampling.

4.3.3. Soil Sampling

Soil samples were collected between March 24 and April 4, 2000 from 10 AOCs and from two boring locations used to evaluate constituent concentrations in soil for assessment of background conditions. Boring logs and monitoring well installation logs are provided (Attachment E). The soil samples were collected from the split-spoons during the installation of monitoring wells MW-2D, MW-4D and MW-6D. Consistent with the approved Workplan, samples were collected from the top interval of soil/fill material below the concrete cover, from the 6-inch interval above the ground water, the 6-inch interval above the peat layer, within the peat layer and from a 6-inch interval below the peat layer. The soil samples from the soil borings were collected using 4-foot core samplers advanced with a Hurricane rig. The core sampler was advanced in a manner such that the depth of the water table could be determined. Soil samples were collected from the 6-inch depth interval below the concrete cover and from the 6-inch depth interval above the water table. For two boring locations (B-11 and B-12), limited access required the use of a stainless steel hand auger. Volatile organic samples were collected using a plastic syringe following the methanol preservation method, while other soil samples were collected using stainless steel trowels and bowls to fill the laboratory-supplied jars. All sampling equipment was decontaminated, consistent with the NJDEP Field Sampling Procedures Manual (NJDEP. 1992).

Analyses were conducted consistent with the approved Workplan (Table 5). In addition to standard priority pollutant analyses, sulfate, sulfide and total organic carbon (TOC) were analyzed to provide data to support the fate and transport evaluation.

5. REMEDIAL INVESTIGATION RESULTS

Results from the ground water and soil sampling are described below. For ground water, the results (Table 6) are discussed based on the hydrologic unit; soil results are discussed on an AOC-by-AOC basis (Tables 7-17).

5.1. Ground Water

For most analytical parameters, constituent concentrations in the shallow monitoring wells were substantially higher than constituent concentrations in the peat and deep wells, consistent with the hypothesis that there is limited vertical movement of site-related constituents and the peat layer limits the downward transport of constituents from the shallow ground water to the underlying deep aquifer (Table 5). Although not applicable to aquitards and non-potable ground water, the analytical results were screened using NJDEP Ground Water Quality Standards for Class II aquifers (GWQS) (N.J.A.C. 7:9-6).

Constituent concentrations detected in the shallow ground water during this sampling event were consistent with the previous ground water monitoring conducted as part of the RI (November 1996 to July 1999). The primary constituents of concern in ground water are benzene, tetrachloroethene, and trichloroethene. In the shallow ground water, benzene was detected at the highest concentrations in monitoring wells MW-1, MW-2, and MW-4. For tetrachloroethene and trichloroethene, the highest concentrations were detected in MW-2, with substantially lower concentrations in all other wells. In the deep ground water, tetrachloroethene and trichloroethene were detected at the highest concentrations in MW-2, although concentrations detected in MW-4 indicate a potential off-property source. Benzene was not a concern in the deep ground water.

For the inorganics, arsenic, lead, and mercury were the primary constituents of concern. Concentrations of these constituents were highest in the shallow ground water, while concentrations in the deep ground water were below GWQS (for mercury) or only slightly higher than the GWQS. The distribution of arsenic and lead ground water concentrations does not correlate with soil concentrations.

The data base from 1996 to 2000 supports an overall decreasing trend for most constituents (Tables 19-20), supporting the conclusion that no on-going sources in soil are present that continue to adversely affect ground water quality.

The ground water analytical results are described below by water-bearing unit.

5.1.1. Shallow Monitoring Wells

Some VOAs were detected at concentrations above GWQS (Table 5), primarily chlorinated organic constituents and their breakdown products. The primary VOAs detected above the standards included benzene (average = 593 μg/l; ND to 3,200 μg/l), tetrachloroethene (average = 443 μg/l; ND to 2,500 μg/l), and trichloroethene (average = 442; ND to 2,600 μg/l) (Figure 12). MW-2 had the highest VOA concentrations, while MW-1, MW-3, MW-4 and MW-6 had substantially lower constituent concentrations, and no VOAs were detected in MW-5 at concentrations above the ground water quality standards.

Analyses for semi-volatile organic compounds (SVOCs) were performed for MW-6. No SVOCs were detected at concentrations above GWQS. The only pesticide detected was alpha-BHC (0.2 μg/l vs. GWQS of 0.02 μg/l); alpha-BHC was not produced on-site, is not attributable to current or historical site operations, was not detected in MW-6D (see below), and was not detected in soil from AOC 9. No PCBs were detected in MW-6.

Arsenic (average = 277 μg/l; 5.7 to 580 μg/l), lead (average = 9.2 μg/l; ND to 27 μg/l) and mercury (average = 2.8 μg/l; ND to 9.2 μg/l) were the only inorganic constituents detected at concentrations above GWQS in the shallow monitoring wells (Figures 9-11). The heterogeneity of the arsenic concentrations and the lack of any site-related uses of arsenic support the conclusion that the arsenic concentrations are related to the historic fill (see historic fill discussion, Section 5.3), not former site operations. For mercury, previously a significant ground water concern, the concentrations only slightly exceed GWQS (1 μg/l) and were only detected in MW-2 and MW-4 at concentrations greater than GWQS. For lead, the average ground water concentration was less than GWQS (10 μg/l) and only was detected above GWQS in MW-2 and MW-6.

5.1.2. *Peat Monitoring Wells*

Chlorinated VOAs were detected at concentrations above the ground water quality standards (although NJDEP ground water quality standards are not applicable to the ground water in the peat layer) in MW-2P. The constituents included 1,1-dichloroethane (2,000 μg/l), 1,1-dichloroethene (230 μg/l), tetrachloroethene (33,000 μg/l), and trichloroethene (12,000 μg/l). For MW-4P, benzene (290 μg/l), tetrachloroethene (1.2 μg/l), trichloroethene (3.3 μg/l), and vinyl chloride (8.4 μg/l) were detected. For MW-6P, no VOAs were detected at concentrations above ground water quality standards.

For MW-2P, arsenic (246 μg/l) and mercury (3.2 μg/l) were detected above GWQS. For MW-4P, arsenic (215 μg/l), lead (213 μg/l) and mercury (87 μg/l) were detected above GWQS. For MW-6P, a highly turbid sample, several inorganic constituents were detected, including arsenic, beryllium, cadmium, chromium, copper, lead, and nickel. These constituents were detected at concentrations substantially higher than the concentrations detected in MW-6 and MW-6D. Due to slow recharge within the peat layer, a sufficient volume of ground water could not be obtained to evaluate the dissolved concentrations. However, as demonstrated with MW-4D and previous ground water sampling (Emcon. 1998), the majority of constituents are particulate bound and not mobile (based on filtered vs. unfiltered results and low-flow vs. standard purge techniques).

5.1.3. Deep Monitoring Wells

VOA concentrations in the deep monitoring wells were substantially lower than in the shallow monitoring wells. The highest VOA concentrations were detected in MW-2D; VOAs detected above the GWQS included 1,1-dichloroethene, 1,1,1-Trichloroethane (1,000 μg/l), tetrachloroethene (1,700 μg/l) and trichloroethene (48 μg/l). For MW-4D, only tetrachloroethene (2.5 μg/l) was detected above GWQS (1 μg/l). MW-6D contained benzene (1.4 μg/l), tetrachloroethene (22 μg/l), and trichloroethene (19 μg/l).

Analyses for semi-volatile organic compounds (SVOCs) were performed for MW-6. No SVOCs were detected at concentrations above GWQS. No pesticides or PCBs were detected in MW-6D.

Mercury was not detected in any deep well at a concentration above GWQS. For MW-2D, no inorganic constituents were detected at concentrations above GWQS. For MW-4D, the filtered sample did not contain any inorganic constituents at concentrations above GWQS. A filtered sample was collected because of the high turbidity observed in the ground water during sampling. The unfiltered sample contained concentrations of arsenic, chromium, lead and nickel at concentrations above GWQS. In MW-6D, arsenic (12.2 μg/l) and lead (21.8 μg/l) were detected slightly above GWQS.

Based on a comparison of the primary constituents detected in ground water in the three monitoring well clusters (Table 6), constituent concentrations typically decrease substantially between the shallow and deep ground water, consistent with the conceptual site model that predicts that the peat layer limits the downward transport of constituents. For the chlorinated VOCs, the detection of tetrachloroethene and trichloroethene in MW-4D but not in MW-4 is not consistent with a Troy-related source. Rather, based on ground water flow directions in the deep ground water (Figure 8), the detected ground water concentrations would be predicted to originate at an off-site source (Albert Steel Drum/Prentiss Drug Superfund Site).

5.1.4. Ground Water Data Quality Evaluation

The overall data quality was acceptable and all data were usable. Consistent with the Quality Assurance Project Plan (ELM. 1999), two ground water duplicate samples were collected. In addition, one trip blank was analyzed for VOAs. No VOAs were detected in the trip blank (Table 5). For the duplicate samples, MW-4D_Dup and MW-6D_Dup, the analytical results between the initial and duplicate sample were consistent and no significant discrepancies were noted.

5.2. Soil

The primary constituents detected in soil above NJDEP soil cleanup criteria (Tables 7-17) were inorganic constituents specifically arsenic, lead and mercury (Figures 9-11). Although all soil on the Troy property is below concrete or buildings that preclude direct exposure during normal facility operations, the analytical results were compared to both restricted use direct contact and impact-to-ground water criteria, where available.

Arsenic soil concentrations across the property were heterogeneous, with deeper concentrations often exceeding the shallower concentrations. There was no observed relationship between soil concentrations and ground water concentrations. As with arsenic, there was no observed relationship between lead soil concentrations and ground water concentrations. Lead was detected at the highest concentrations in AOCs 1, 4 and 7.

VOCs were detected at concentrations above the NJDEP soil cleanup criteria in AOCs 1, 7, 8, 9, 11, and 12; benzene was the primary VOC detected. However, the detected VOC concentrations in soil were not consistent with any significant on-going sources to ground water. As described below, in many sampling locations where VOC concentrations in soil exceeded the IGW in the shallow sampling interval, the VOC concentrations in the deeper sample collected from the interval immediately above the ground water table were substantially lower and were below IGW. In addition, the highest ground water concentrations were detected in AOC 2, where no VOCs were detected in soil during the 1996 sampling event at concentrations above the IGW. Additionally, PAHs were detected at concentrations above the NJDEP soil cleanup criteria in several AOCs. The PAH concentrations were heterogeneous and not attributable to any site-related operations.

5.2.1. Background Borings

Two background borings, B-1 and B-2, were collected along Avenue L (Figure 2), to characterize the fill/soil in an area that was clearly not affected by facility operations. Volatile organic constituents were detected in these samples at concentrations that were all below both direct contact (non-residential) and impact to ground water soil cleanup criteria (Table 7). Polynuclear aromatic hydrocarbons (PAHs) were also detected, with Benzo(a)pyrene being detected at concentrations above the non-residential direct contact soil cleanup criterion in samples B-1 (3.5- to 4-foot depth interval) and B-2 (0.5- to 1- and 4.5-to 5-foot depth intervals). Arsenic (average = 26.6; 12.1 to 46.2 mg/kg) and lead (average = 298; 162 to 607 mg/kg) were also detected at concentrations exceeding the direct contact soil cleanup criteria (Figure 9). These samples support conclusions that the historic fill material used as part of the property development contained constituents at concentrations that exceed NJDEP soil cleanup criteria and that the heterogeneous constituent concentrations (PAHs, some inorganics, pesticides, etc.) detected in soil/fill material across the property are related to historic fill, not to historical operations at the facility.

5.2.2. AOC 1 – Former Mercury Recovery Still and Tank Farm Area

Three additional borings were installed to determine the horizontal and vertical distribution of VOCs detected during previous sampling (Emcon. 1998) (Table 8). Benzene (average = 7,300 µg/kg; ND to 33,000 µg/kg), tetrachloroethene (average = 800 µg/kg; ND to 2,700 µg/kg) and trichloroethene (average = 1,800 µg/kg; ND to 4,100 µg/kg) were detected at concentrations slightly above the New Jersey impact to ground water (IGW) criteria (1,000 µg/kg for these VOCs). During the 1996 sampling, benzene (3,000 µg/kg) along with toluene (200 µg/kg 'J'), xylenes (1,700 µg/kg), tetrachloroethene (700 µg/kg 'J') and several PAHs were detected. Of the PAHs, fluorene (16,000 µg/kg) was detected above the IGW; however it was not detected in the ground water, while others (e.g., benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, etc.) were detected above the non-residential direct contact criteria.

The soil samples were also analyzed for arsenic, lead, and mercury. Arsenic was detected in all six samples (average = 288 mg/kg; 35.3 to 890 mg/kg) with no pattern in the distribution of concentrations. As a result, the arsenic was attributed to the historic fill. For both lead (average = 15,145 mg/kg; 352 to 61,000 mg/kg) and mercury (average = 730 mg/kg; 13.2 to 2,380 mg/kg), the shallow concentrations were substantially higher than deeper concentrations. Arsenic (22.5 mg/kg), copper (694 mg/kg), lead (2,470 mg/kg), and mercury (4290 mg/kg) were detected in TB-1 S-1 during the 1996 RI investigation (Table 2; Emcon. 1998a).

These inorganic constituents were detected at concentrations above the non-residential soil cleanup criteria; however, the fill/soil is below a concrete/asphalt cover that precludes direct contact. Because lead and mercury were not detected in ground water at concentrations above GWQS, the fill/soil does not adversely affect ground water quality.

5.2.3. *AOC 2 – Building 56 – Former Mercury Treatment System*

Five soil samples were collected during the installation of MW-2D. Because no organic constituents were detected at concentrations above soil cleanup criteria during the previous investigations (Table 2; Emcon. 1998), these soil samples were analyzed for arsenic, lead and mercury, as well as sulfates, sulfides and TOC (Table 9). Consistent with the 1996 soil samples (Table 2) only arsenic was detected at concentrations above non-residential direct contact soil cleanup criteria. The arsenic concentrations were higher in the fill material above the peat layer (31.7 to 43.2 mg/kg) than the concentrations measured in the peat (4.1 mg/kg) and below the peat (2.9 mg/kg). Lead concentrations in the soil were below 432 mg/kg, while mercury concentrations were below 73.6 mg/kg.

5.2.4. *AOC 3 – Former Septic Tank*

No soil samples were collected from AOC 3 during this investigation. During the 1996 RI sampling, arsenic (25.8 mg/kg 'J' to 266 mg/kg) and lead (21.8 mg/kg 'J' to 739 mg/kg 'J') were the only constituents detected above non-residential direct contact soil cleanup criteria (Table 2; Emcon. 1998a).

5.2.5. *AOC 4 – Material Storage Area*

Based on the previous analytical results (Table 2), the soil samples from MW-4D were analyzed for arsenic, lead, and mercury (Table 10). Arsenic was detected at an average concentration of 19.6 mg/kg (4.2 to 42.1 mg/kg), with only the 0.5- to 1-foot depth interval containing a concentration that exceeded the non-residential direct contact soil cleanup criterion (20 mg/kg). Similarly, lead was detected only in the 0.5- to 1-foot depth interval containing a concentration (918 mg/kg) that exceeded the non-residential direct contact soil cleanup criterion (600 mg/kg). In the three soil samples collected above the peat layer, mercury was detected above the non-residential direct contact soil cleanup criterion (270 mg/kg), while the samples from within the peat and below the peat were below the non-residential direct contact soil cleanup criterion. Arsenic, lead and mercury were also detected above the direct contact cleanup criteria during the 1996 RI sampling (Table 2; Emcon. 1998a).

Although the soil concentrations of arsenic, lead, and mercury were above the direct contact cleanup criteria, the site-specific conditions and facility operations limit the potential for employees to be exposed to the soil. As a result, the soil was not considered a potential risk to human health.

Based on the ground water results for the MW-4 cluster of monitoring wells (Section 5.1; Table 5), these soil concentrations are not having a significant adverse effect on ground water quality, either in the shallow or deep aquifers.

5.2.6. AOC 5 – Historical Sample Location along Southern Property Boundary

No soil samples were collected from AOC 5. During the 1996 RI, soil samples were collected. No VOAs were detected above NJDEP soil cleanup criteria while arsenic (13.1 µg/kg 'J' to 65.9 µg/kg 'J') and lead (40.2 µg/kg to 10,800 µg/kg) were the only inorganics detected above non-residential direct contact soil cleanup criteria (Table 2; Emcon. 1998).

5.2.7. AOC 6 – Building 20

Two soil samples from one soil boring were collected adjacent to Building 20 (Table 11). The boring location was adjusted from the location in the RIW because of underground utilities running along the eastern edge of the building near the loading dock. No VOCs were detected above New Jersey soil cleanup criteria. Benzo(a)pyrene was detected in the 0.5- to 1-foot depth interval below direct contact soil cleanup criterion and slightly above the criterion in the 1.5- to 2-foot depth interval. Mercury was also detected at 1,910 mg/kg, above the non-residential direct cleanup criterion (270 mg/kg); the mercury concentration in the deeper sample from the 1.5- to 2-foot depth interval (4.5) was substantially lower than the soil cleanup criterion, supporting a conclusion that the shallow sample has a limited extent.

5.2.8. *AOC 7 – Buildings 30 and 30a, Including Sump Area*

Four soil samples were collected from two borings, B-7 and B-14 (Figure 2; Table 12). Benzene was the only VOC detected at a concentration above IGW soil cleanup criteria. In the 0.5- to 1-foot depth interval, benzene was detected at 3,300 μg/kg compared to the IGW of 1 mg/kg. The benzene concentration in the deeper sample from B-14 was 390 mg/kg, approximately 10-fold lower and below the IGW. As such, it was concluded that this area was not a potential source of VOCs to ground water.

Two PAHs were detected at concentrations exceeding the non-residential direct contact soil cleanup criteria. Benzo(b)fluoranthene was detected between 1,200 to 5,400 μg/kg, with an average concentration of 2,500 μg/kg; the average is below the direct contact soil cleanup criterion. Benzo(a)pyrene was detected from 860 to 4,500 μg/kg, all concentrations above the direct contact soil cleanup criterion. These samples were collected in an area with a concrete cover that precludes direct contact with the soil.

PCBs were detected in the 0.5- to 1-foot depth interval of boring B-14 (Aroclor-1254 at 8,200 μg/kg and Aroclor-1260 at 19,00 μg/kg) at concentrations above the direct contact soil cleanup criterion. The PCB concentrations in the 1.5- to 2-foot depth interval were below the cleanup criterion and support a conclusion that no adverse impact to ground water quality would be predicted. As noted above, this area is covered by a concrete cover, and no direct contact with fill/soil occurs.

The inorganic constituents arsenic, chromium, copper, lead and zinc were detected in at least one sample above the non-residential direct contact soil cleanup criterion (typically in B-14_0.5-1). With the exception of lead in boring B-7, the constituent concentrations always decreased substantially between the 0.5- to 1-foot depth interval and the 1.5- to 2-foot depth interval. No potential for direct contact exists in this AOC.

5.2.9. *AOC 8 - Building 40 and 41*

Two borings, B-6 and B-15 were drilled in AOC 8 (Table 13). Benzene was detected from 300 to 6,500 µg/kg. No other VOCs were detected above New Jersey soil cleanup criteria. Benzo(a)pyrene was detected in the shallow samples from both B-6 and B-15 at concentrations slightly above the non-residential direct contact soil cleanup criterion; no other SVOCs, base neutrals, pesticides or PCBs were detected above New Jersey soil cleanup criteria. For inorganic constituents, the only constituent detected above non-residential direct soil cleanup criteria was arsenic. In the duplicate sample for B-6_7.5-8, arsenic was detected at 22.5 compared to 14.0 in the initial sample for B-6_7.5-8.

Based on these results, no additional soil investigation is warranted for this area.

5.2.10. *AOC 9 - Building 71*

Soil samples were collected from boring B-3 and during the installation of MW-6/6P/6D (Table 14). Chlorobenzene (2,100 µg/kg 'J') was estimated at a concentration slightly above the IGW (1,000 µg/kg) in B-3, 0.5- to 1-foot depth interval but was non-detect in the 1- to 1.5-foot depth interval. Chlorobenzene has not been detected in ground water in any wells at a concentration that exceeds GWQS, and this sample result is likely an analytical artifact. No other VOCs were detected at a concentration above New Jersey soil cleanup criteria; however, detection limits were elevated above some criteria because of a high dilution factor.

Four PAHs [fluoranthene, pyrene, benzo(b)fluoranthene, and benzo(a)pyrene] were detected in the shallow sample collected from B-3 at concentrations that exceed the IGW. The concentrations of these constituents all decreased substantially from the shallow to the deeper interval from above the ground water table, and no PAH was detected in the deeper sample at a concentration above the IGW; as noted above (Section 5.1), no PAH has been detected in ground water at a concentration that exceeds GWQS. Some PAHs also exceeded the non-residential direct contact soil cleanup criteria including benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene and dibenz(a,h)anthracene.

Arsenic (average = 82.5 mg/kg; 3.1 to 460 mg/kg) was the only inorganic constituent detected above the non-residential direct contact soil cleanup criteria. These concentrations are attributed to the historic fill used prior to the property development.

These soil samples were collected in an area that is entirely covered with concrete, and no direct exposure to the fill/soil occurs.

5.2.11. AOC 10 – Building 81

Soil samples were collected from two borings using a hand auger (Table 15). Based on previous data, the mercury concentrations in this area were over 1,000 mg/kg. For B-11, lead was detected above the non-residential direct contact soil cleanup criterion (600 mg/kg) in the 0.5- to 1-foot depth interval (821 mg/kg) and the 2- to 2.5-foot depth interval (601 mg/kg). Lead concentrations in both samples from B-12 were below 600 mg/kg. Mercury was detected above the direct contact soil cleanup criterion (270 mg/kg) in B-11 at 1,260 mg/kg (0.5- to 1-foot depth interval) and 4,000 mg/kg (2- to 2.5-foot depth interval) and in B-12 at 481 mg/kg (0.5- to 1-foot depth interval). The mercury concentration in soil from B-12 was 61.8 in the 2- to 2.5-foot depth interval.

The area sampled is covered by asphalt and is between Building 81 and Pierson's Creek. As a result, there is no potential for direct contact with the fill/soil in this area.

5.2.12. AOC 11 – Vicinity of Process Sewer Line

Two borings (4 samples) were drilled along the process sewer line (Table 16). Benzene and ethylbenzene were detected at concentrations above the IGW in B-4_0.5-1 (13,000 µg/kg and 380,000 µg/kg, respectively) but at substantially lower concentrations in the deeper sample, B-4_1.5-2 (500 µg/kg and 9,700 µg/kg, respectively. Benzene was also detected above the IGW in B-16_1.5-2 (7,700 mg/kg), but below the IGW in B-16_0.5-1 (920 µg/kg 'J'). Benzo(a)pyrene was the only semi-volatile/base neutral constituent detected above NJDEP soil cleanup criteria. Benzo(a)pyrene was detected at 2,100 µg/kg in B-16_1.5-2, above the direct contact cleanup criterion of 860 µg/kg; it was detected at 430 µg/kg in the shallow sample

(0.5- to 1-foot depth interval) from B-16. No PCBs or pesticides were detected at concentrations above the NJDEP soil cleanup criteria.

Arsenic (23.4 mg/kg) was the only inorganic constituent detected at a concentration above NJDEP soil cleanup criteria.

5.2.13. AOC 12 – Building 61

Four soil samples from two borings were collected from AOC 12 (Table 17). Benzene was the only VOC detected at a concentration above NJDEP soil cleanup criteria. Benzene was detected in B-13 at 0.24 and 8,300 µg/kg (0.75-1.25 and 3-3.5-foot depth intervals, respectively). Benzene was detected in B-17 at 1,900 and 12,000 µg/kg (0.75-1.25 and 3-3.5-foot depth intervals, respectively). The only PAH detected above soil cleanup criteria was benzo(a)pyrene at 1.1 and 940 µg/kg (B-13_3.5-4 and B-17_3-3.5, respectively).

The only pesticide detected above NJDEP soil cleanup criteria was 4,4'-DDD. It was detected in B-13_0.75-1.25 at 46 µg/kg, B-13_3.5-4 at 20,000 µg/kg, B-17_0.75-1.25 at 34 µg/kg and B-17_3-3.5 at 52,000 µg/kg, compared to a direct soil cleanup criterion of 12,000 µg/kg and IGW of 50,000 µg/kg. Because 4,4-DDD is a breakdown product of 4,4'-DDT which was not detected in this location or other locations across the property, these results are considered an anomaly.

Arsenic (average = 201 mg/kg; 2.4 to 670 mg/kg) was the only inorganic constituent detected at a concentration above NJDEP soil cleanup criteria.

5.2.14. Soil Data Quality Evaluation

The overall data quality was acceptable and all data were usable. Four duplicate soil samples were collected and analyzed along with three trip blanks (3/22/00, 3/27/00 and 4/3/00). No VOAs were detected in the trip blanks. For the duplicate samples, B-3_0.5-1, B-5_1.5-2, B-6_7.5-8 and B-15_7-7.5, the analytical results between the initial and duplicate sample were comparable. The observed differences between the original and duplicate samples were typical of the normal variation associated with sampling and analyzing soil samples. No significant discrepancies were noted.

5.3. Historic Fill Evaluation

The analytical data were evaluated along with the soil boring logs and historical information about the site development to document the presence of historic fill. Based on the boring logs, the entire site was constructed on historic fill material (Figure 4; Attachments B and E). This is also supported by review of the historical site development as interpreted from Sanborn maps and aerial photographs (described in Emcon. 1998a) that concluded the Troy property and surrounding properties were developed using fill material.

The use of historic fill to develop the property is supported by the analytical data. For example, arsenic was detected in soil across the property (average concentration = 99 mg/kg; 2.4 to 890 mg/kg) with no pattern that would indicate a source from historical operations (Figure 9). Specifically, the highest concentrations in the vertical profile occur at various depths, in contrast to the site-related chemical constituents such as mercury. Samples (B-1 and B-2) from areas that are known to be beyond any current or historical Troy operations contained arsenic concentrations that exceeded the NJDEP soil cleanup criteria (20 mg/kg). These arsenic concentrations are consistent with the historic fill concentrations in the Technical Requirements (average = 13.1 mg/kg, maximum = 1,098 mg/kg) (N.J.A.C. 7:26E-4.6, Table 4-2). Soil samples collected from below the peat layer (MW-2D_11-11.5 - 2.9 mg/kg; MW-4D_13.5-14 - 4.2 mg/kg; and MW-6D_12-12.5 - 3.1 mg/kg) contained arsenic concentrations substantially below the concentrations detected in the historic fill material.

5.4. Overview of Environmental Conditions and Fate and Transport and Exposure Assessment

The property has been used for industrial operations for over 100 years and was developed using historic fill material. The historic operations and historic fill have resulted in the presence of various constituents in the soil/fill and ground water above the NJDEP soil cleanup criteria and ground water quality standards. For most constituents, the concentrations are heterogeneous and are not representative of environmental releases. Based on a review of all RI data, the primary constituents in soil/fill that may be attributed to facility operations are lead, mercury, and benzene. For benzene, the highest soil concentrations were detected in AOCs 1, 11 and 12 while soil concentrations slightly above the IGW were detected in AOCs 7 and 8. The highest lead concentrations (up to 61,000 mg/kg) were detected in AOCs 1 and 5, while mercury concentrations (up to 4,000 mg/kg) were detected in AOCs 1, 6 and 10. Arsenic, PAHs and several other constituents were detected across the property; however, these constituents were considered a component of the historic fill (see Section 5.3). As stated previously, all soil is covered by concrete, and no direct contact occurs during routine operations. In addition, the elevated soil concentrations that may be attributed to facility operations occurred over a decade ago, and the constituents have attenuated such that the soil concentrations are not an on-going source to ground water.

There are numerous physical and biological factors that affect the potential fate and transport of site-related constituents in the soil and ground water on the Troy property. These factors were described in detail in the Remedial Investigation Report (Emcon. 1998a) and include advection, dispersion, sorption, volatilization, and degradation (photolysis, chemical degradation such as hydrolysis, and biodegradation). Concentrations of the primary organic constituents (benzene, tetrachloroethene, and trichloroethene) can be affected by all or some of these factors. Benzene, for example, can be readily degraded by bacteria. Tetrachloroethene and trichloroethene can also be degraded biologically through reductive dehalogenation. Data collected during 1997, including chemical and physical parameters (i.e., redox, dissolved oxygen, ferrous iron, etc.) of the ground water, support the conclusion that the subsurface environment is conducive to degradation (Emcon. 1998b). That degradation is occurring on the Troy property is supported by the detection of the common breakdown products of this biological process, cis-1,2-dichloroethene and vinyl chloride).

Based on the existing soil and ground water data, the conceptual site model and the site history, there is limited potential for exposure to site-related COCs, even though the COCs occur throughout the Troy property. As such, the remedial alternatives for the risk management of these COCs were evaluated in the context of exposure assessment and risk management. The two primary exposure pathways are: (1) direct contact and (2) fate and transport within the subsurface environment to a potential receptor.

As noted previously, there is no potential for routine, direct contact with soil because of the concrete/asphalt material and buildings that cover the property. The only potential direct exposure would be during short-term invasive activities such as utility repairs or construction activities. As a remedial alternative together with institutional controls such as deed notices, the cover material effectively limits the potential for exposure and decreases the potential for constituents in the soil to leach to ground water.

When the ground water data and soil data are evaluated together, the data support that no AOCs are an on-going source to ground water. This conclusion is based on the existing ground water data, the existing soil data, the control of surface water flow across the site, and that no potential on-going sources to ground water have been identified. The conclusion is also supported by the overall trend of decreasing ground water concentrations over the several years of monitoring (1980s to 2000).

For ground water, there are two principal water-bearing units. Based on the head measurements in the shallow, peat, and deep monitoring wells, there is a general downward head. However, given the low hydraulic conductivity, the movement of any COCs in the shallow ground water is slow and attenuation is rapid in the clay and organic matter of the peat layer. For the shallow ground water, COCs are predicted to be discharged into Pierson's Creek or its tributary.

Because the shallow ground water is not currently and will not in the future be used as a potable source of water, the ground water should be evaluated for the potential for adverse effects on aquatic life in Pierson's Creek. For the deep ground water, the limited downward transport of COCs is supported by the analytical data, whereby the COC concentrations in deep ground water are substantially lower than in the shallow ground water, despite the decades of ground water flow and past operations. For most COCs (particularly inorganic constituents) that are detected in the shallow ground water at concentrations above GWQS, the concentrations in the deep ground water are below GWQS.

6. REMEDIAL ALTERNATIVES ANALYSIS

6.1. Soil Remedial Action Alternative Evaluation

Given the lack of significant direct contact exposure under current conditions and the intensive industrial use of the property, Troy identified the following remedial action alternatives for soil:

- No action;
- Maintenance of the existing property cover with institutional controls; and
- Hot spot removal with institutional controls and maintenance of the existing property cover.

Because the property already has a cover that limits the potential exposure to site-related COCs and because constituent concentrations in soil exceed the NJDEP restricted use soil cleanup criteria, the no action alternative was not evaluated further for soil. The other two alternatives are evaluated below.

6.1.1. **Alternative 1** – *Institutional Controls and Maintenance of the Existing Cover*

The objective of this alternative would be to minimize the potential for direct contact with soil, through the maintenance of the existing cover that precludes inadvertent direct contact and the establishment of a deed notice to preclude future residential use of the property and to notify future property owners of the current site conditions. The cover also controls storm water runoff and reduces infiltration through the soil, thereby protecting the ground water.

Protection of Public Health, Public Safety and the Environment

This alternative is protective of public health, in that it would minimize the direct contact exposure scenario for human direct contact with site-related constituents in soil. The existing cover is also protective of the environment because no ecological receptors are exposed to soil. In addition, the existing cover reduces storm water infiltration by collecting storm water for treatment and disposal limiting the potential for constituents in soil to be transported to the ground water.

Ease of Implementation

This remedy can be easily implemented. The property is currently covered with concrete, asphalt or buildings in areas with contamination. No additional cover would be required. The deed notice is also readily employed and would include a requirement for inspection and maintenance of the cover.

Consistency with Other Applicable Federal, State and Local Laws and Regulations

The use of an engineered cover to control potential exposures, along with institutional controls is consistent with applicable Federal, State and Local laws and regulations.

Potential Impacts on the Local Community

This alternative has no adverse effect on the local community.

Degree of Permanence

This alternative is not permanent because constituents will remain in soil above the NJDEP unrestricted use soil cleanup criteria. In addition, maintenance of the cover will be required.

Potential Natural Resource Injury

No natural resource injury is associated with this remedial alternative as the site is and has been under industrial use for over 100 years.

6.1.2. Alternative 2 – Hot Spot Removal with Institutional Controls and Maintenance of the Existing Property Cover

The objective of this alternative would be to remove hot spots of contamination, to minimize the potential for direct contact with soil through the maintenance of the existing cover that precludes inadvertent direct contact and the establishment of a deed notice to preclude future residential use of the property and to notify future property owners of the current site conditions. The cover also controls storm water runoff and reduces infiltration through the soil, thereby protecting the ground water.

Protection of Public Health, Public Safety and the Environment

This alternative is protective of public health in that it would minimize the long-term direct contact exposure scenario for human direct contact with site-related constituents in soil. However, there is a substantial risk of exposure through direct contact if excavation is employed on the active industrial site. Storm water and sediment erosion control measures will be of limited effectiveness, given the site conditions. The existing cover is also protective of the environment because no ecological receptors are exposed to soil. In addition, the existing cover reduces storm water infiltration by collecting storm water for treatment and disposal, limiting the potential for constituents in soil to be transported to the ground water.

Ease of Implementation

The hot spot portion of this remedial alternative would be extremely difficult to implement because of the constraints due to access and site activity. The cover and institutional controls can be easily implemented. The property is currently covered with concrete, asphalt or buildings in areas with contamination. No additional cover would be required. The deed notice is also readily accomplished.

Consistency with Other Applicable Federal, State and Local Laws and Regulations

This alternative is consistent with applicable Federal, State and Local laws and regulations.

Potential Impacts on the Local Community

This alternative has no adverse effect on the local community.

Degree of Permanence

This alternative is not permanent because it will not remove all constituents in soil above the NJDEP unrestricted use soil cleanup criteria. In addition, maintenance of the cover will be required.

Potential Natural Resource Injury

No natural resource injury is associated with this remedial alternative, as the site is and has been under industrial use for over 100 years.

6.1.3. Proposed Remedial Action Alternative

Of the two alternatives evaluated pursuant to the Technical Requirements for Site Remediation (N.J.A.C. 7:26E 5):

- Both alternatives would minimize the potential for direct contact with soil and would limit future transport of site-related constituents from the soil to the ground water by controlling storm water infiltration.

- Both alternatives could be implemented using available technologies, equipment and materials.

- Compared to Alternative 1, Alternative 2 would be more difficult to implement and would pose a higher risk to human health and the environment under the current industrial use of the property. In addition, hot spot removal would not have any significant benefits over Alternative 1.

Based on the selection criteria, Troy proposed to implement Alternative 1, which would maintain the existing cover and would complete a deed notice as an additional institutional control. This alternative would minimize any potential future direct contact with site-related constituents in soil and limits the transport of constituents in soil to ground water. Overall, the selected remedy provides the best balance between protection of human health, implementability, effectiveness and cost.

6.2. Ground Water

Troy will document a Classification Exception Area for ground water following a review of ground water quality data from upgradient, off-property sources of contamination.

7. CONCLUSIONS

The results of the additional RI sampling have substantially improved the understanding of the environmental conditions on the Troy property. Based on these results, a soil remedy has been proposed, and limited additional ground water sampling is proposed to support a remedial action alternatives evaluation for ground water.

The soil sampling and analyses have provided a sufficient database to evaluate the distribution of site-related constituents in soil. Based on these data, much of the contamination detected in soil is attributed to historic fill, although there were some areas where site-related constituents were detected and could be attributed to historic operations. The current conditions, however, minimize the potential for exposure to the site-related constituents and to the historic fill material and limit the potential transport of constituents from soil to ground water. As a result, the soil sampling results were used, along with the results from previous remedial investigations (Emcon. 1998a, 1998b), to select a site-wide remedial alternative for soil, maintenance of the existing cover with institutional controls. The institutional controls (i.e., deed notice) will be completed following NJDEP approval of the proposed remedy.

For ground water, the data provided an improved understanding of the relationship between the shallow and deep ground water and demonstrate that the peat layer limits the potential downward transport of site-related constituents from the shallow to the deep ground water. For the shallow ground water, benzene, tetrachloroethene and trichloroethene (along with their breakdown products) are the primary constituents. Based on ground water elevations, the shallow ground water is predicted to discharge into Pierson's Creek where the constituents will be rapidly attenuated, especially because of their short half-lives in the surface water. For the deep ground water, the data support the conclusion that the peat layer and its associated silts, clays and organic matter, limits downward transport of site-related constituents. As noted above, mercury was previously a significant concern in the deep ground water because historical results from the 1980s detected mercury concentrations in the deep ground water at 25,000 μg/l; however, this investigation concluded that mercury concentrations in the deep ground water were below GWQS and the previous results were not confirmed. A review of regional ground water quality will be conducted to determine if the measured concentrations of chlorinated constituents are attributable to an upgradient source. These constituents in the ground water do not pose a potential risk to human health or the environment because of the lack of exposure and the substantial attenuation that would occur prior to discharge in Newark Bay.

8. REFERENCES

Dames & Moore. 1998. Hydrologic and Hydraulic Study for the Rehabilitation of Pierson's Creek. Prepared for the City of Newark, Division of Water and Sewer Utilities.

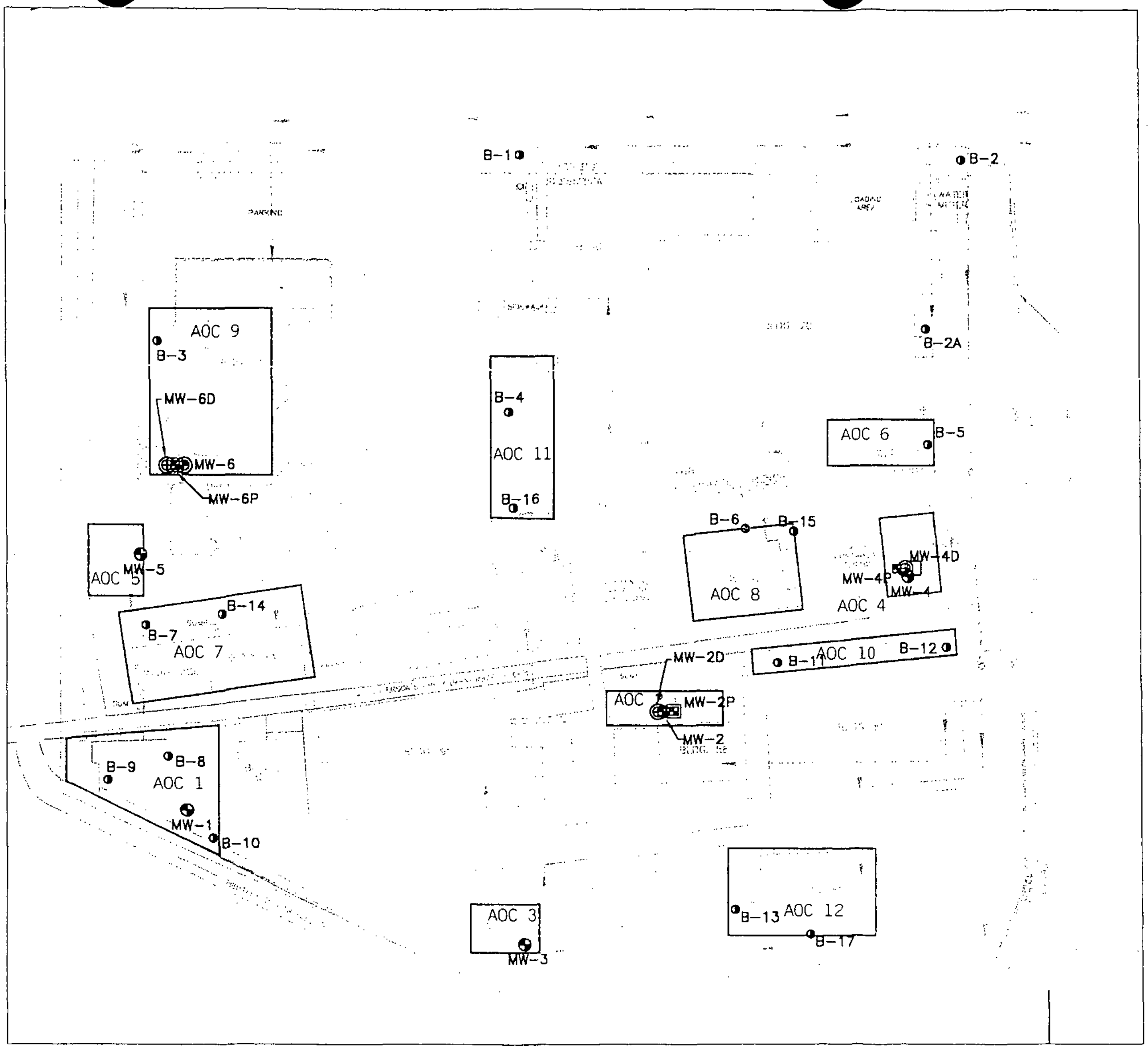
ELM. 1999. Remedial Investigation Workplan for Additional Soil and Ground Water Sampling. Troy Chemical Corporation, Inc.

Emcon. 1998a. Remedial Investigation Report. Troy Chemical Corporation, Inc., Newark, New Jersey.

Emcon. 1998b. Remedial Investigation Addendum. Troy Chemical Corporation, Inc., Newark, New Jersey.

Emcon. 1996. Remedial Investigation/Remedial Alternative Analysis Workplan Addendum, Quality Assurance Project Plan Addendum, Health and Safety Plan Addendum.

NJDEP. 1992. Field Sampling Procedures Manual.



LEGEND:

MW-1	MW-1 MONITORING WELL LOCATION AND ID
MW-6	SHALLOW MONITORING WELL LOCATION AND ID
MW-D	DEEP MONITORING WELL LOCATION AND ID
MW-2P	PEAT MONITORING WELL LOCATION AND ID
B-1	SOIL BORING LOCATION AND ID
	SANITARY SEWER MANHOLE
	TRENCH DRAIN
	INTERMITTENT DRAINAGE FEATURE
	WATER LINE
	GAS LINE
	PROCESS SEWER
AOC 1	AREA OF CONCERN

NOTES:

1. MW LOCATIONS WERE SURVEYED 11/26/96.

SOURCE: EMCON, TROY CHEMICAL CORPORATION, INC., NEWARK, NJ, "SITE INVESTIGATION PLAN", FIGURE: 2, DATE: SEPTEMBER 1998.

0 60 120

SCALE: 1" = 60'

TITLE: FIGURE 2
AREAS OF CONCERN WITH MONITORING WELL LOCATIONS

LOCATION: TROY CHEMICAL CORPORATION, INC. NEWARK, NEW JERSEY

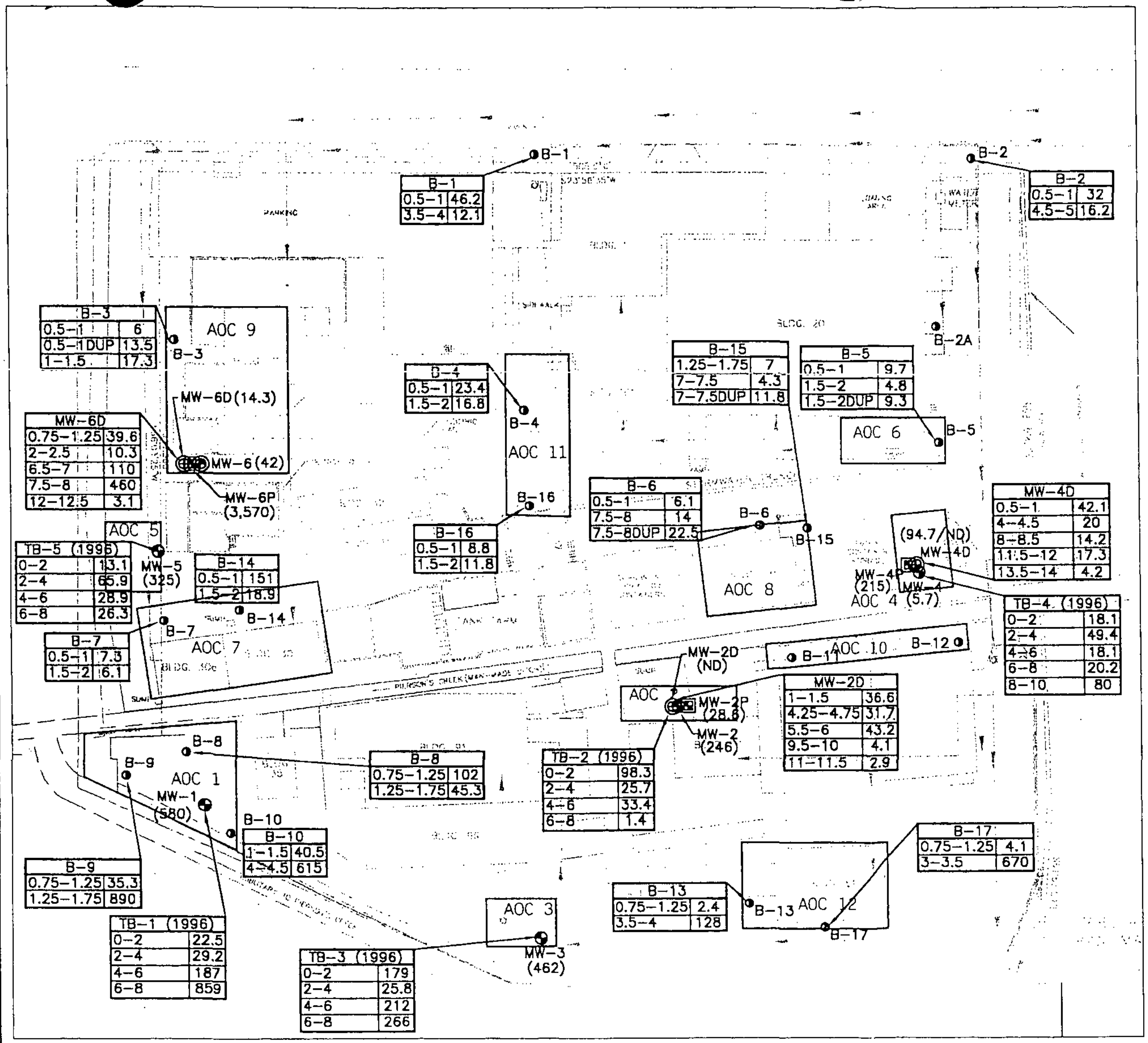
DATE: 7/6/00

PROJECT NO.: 95127

FILENAME: 95127PSAM_REV1

ENVIRONMENTAL LIABILITY MANAGEMENT, INC.

932250101



LEGEND:

- MW-1 — MW-1 MONITORING WELL LOCATION AND ID
- MW-6 — SHALLOW MONITORING WELL LOCATION AND ID
- MW-D — DEEP MONITORING WELL LOCATION AND ID
- MW-2P — PEAT MONITORING WELL LOCATION AND ID
- B-1 — SOIL BORING LOCATION AND ID
- SANITARY SEWER MANHOLE
- TRENCH DRAIN
- INTERMITTENT DRAINAGE FEATURE
- WATER LINE
- GAS LINE
- PROCESS SEWER
- AOC 1 — AREA OF CONCERN

B-5	
0.5-1	9.7
1.5-2	4.8
1.5-2DUP	9.3

SOIL SAMPLE ID, SAMPLE DEPTH (FEET) AND ANALYTICAL RESULT (mg/kg)

(4.8) GROUND WATER ANALYTICAL RESULT (ug/l)

NOTES:

SOURCE: EMCON, TROY CHEMICAL CORPORATION, INC., NEWARK, NJ, "SITE INVESTIGATION PLAN", FIGURE: 2, DATE: SEPTEMBER 1998.

0 60 120

SCALE: 1" = 60'

TITLE: FIGURE 9
SUMMARY OF ARSENIC SOIL AND GROUND WATER RESULTS

LOCATION: TROY CHEMICAL CORPORATION, INC. NEWARK, NEW JERSEY

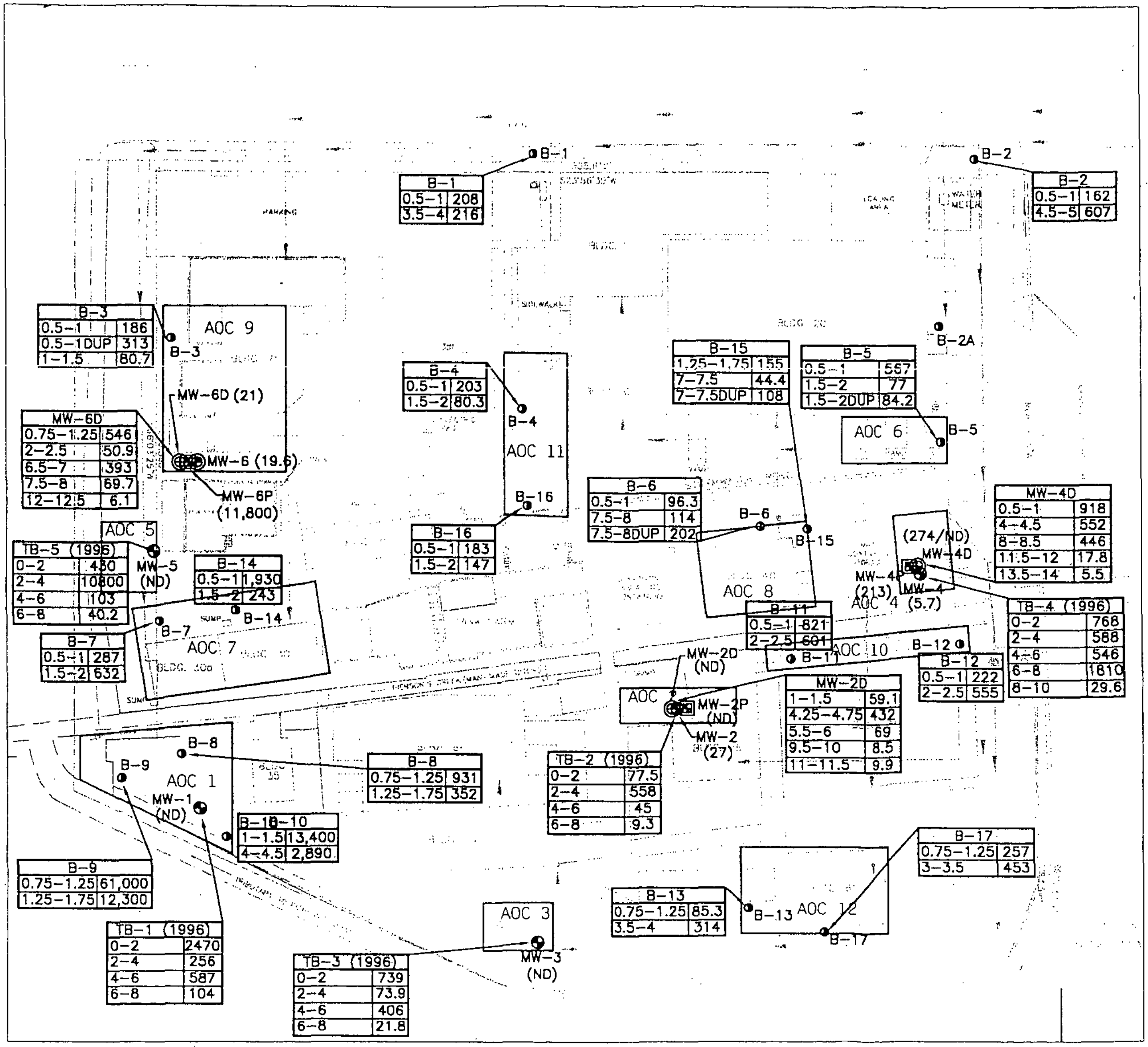
DATE: 7/6/00

PROJECT NO.: 95127

FILENAME: 95127_SOILDATA

ENVIRONMENTAL LIABILITY MANAGEMENT, INC.
218 Wall Street, Research Park, Princeton, NJ 08540
4920 York Road, Ste. 2CC2, P.O. Box 306, Holicong, PA 18928
1259 Route 46 East, Building 1, First Floor, Parsippany, NJ 07054

932250102



LEGEND:

MW-1 MW-1 MONITORING WELL LOCATION AND ID

MW-6 SHALLOW MONITORING WELL LOCATION AND ID

MW-D DEEP MONITORING WELL LOCATION AND ID

MW-2P PEAT MONITORING WELL LOCATION AND ID

B-1 SOIL BORING LOCATION AND ID

SANITARY SEWER MANHOLE

TRENCH DRAIN

INTERMITTENT DRAINAGE FEATURE

WATER LINE

GAS LINE

PROCESS SEWER

AOC 1 AREA OF CONCERN

B-5	
0.5-1	8.7
1.5-2	4.8
1.5-2DUP	9.3

SOIL SAMPLE ID, SAMPLE DEPTH (FEET) AND ANALYTICAL RESULT (mg/kg)

(213) GROUND WATER ANALYTICAL RESULT (ug/l)

NOTES:

SOURCE: EMCON, TROY CHEMICAL CORPORATION, INC., NEWARK, NJ, "SITE INVESTIGATION PLAN", FIGURE: 2, DATE: SEPTEMBER 1998.

0 60 120

SCALE: 1" = 60'

TITLE: FIGURE 10
SUMMARY OF LEAD SOIL AND GROUND WATER RESULTS

LOCATION: TROY CHEMICAL CORPORATION, INC. NEWARK, NEW JERSEY

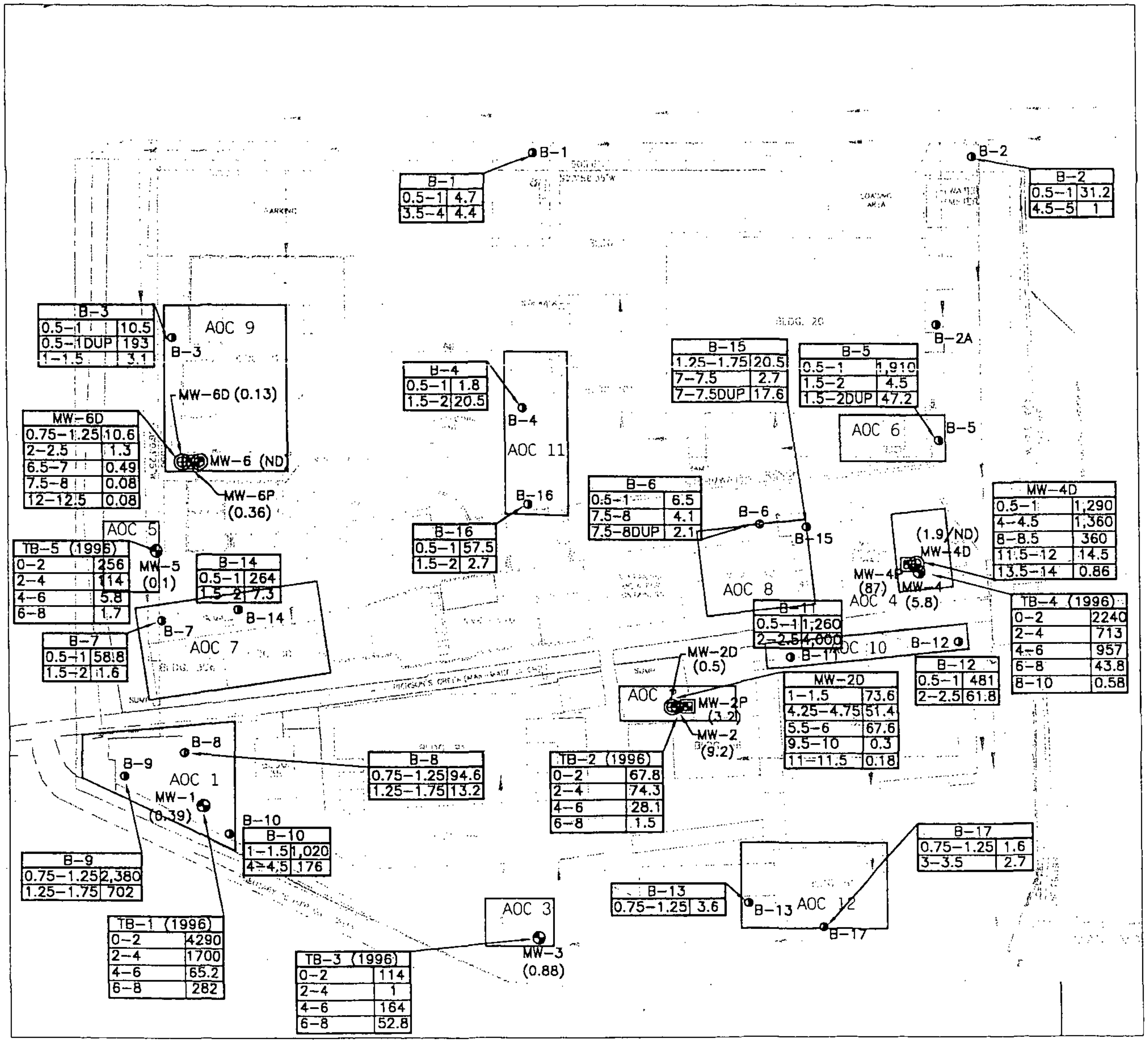
DATE: 7/6/00

PROJECT NO.: 95127

FILENAME: 95127_SOILDATA

ENVIRONMENTAL LIABILITY MANAGEMENT, INC.

932250103



LEGEND:

MW-1 MONITORING WELL LOCATION AND ID

MW-6 SHALLOW MONITORING WELL LOCATION AND ID

MW-D DEEP MONITORING WELL LOCATION AND ID

MW-2P PEAT MONITORING WELL LOCATION AND ID

B-1 SOIL BORING LOCATION AND ID

SANITARY SEWER MANHOLE

TRENCH DRAIN

INTERMITTENT DRAINAGE FEATURE

WATER LINE

GAS LINE

PROCESS SEWER

AOC 1 AREA OF CONCERN

B-5	
0.5-1	9.7
1.5-2	4.8
1.5-2DUP	9.3

SOIL SAMPLE ID, SAMPLE DEPTH (FEET) AND ANALYTICAL RESULT (mg/kg)

(9.2) GROUND WATER ANALYTICAL RESULT (ug/l)

NOTES:

SOURCE: EMCON, TROY CHEMICAL CORPORATION, INC., NEWARK, NJ, "SITE INVESTIGATION PLAN", FIGURE: 2, DATE: SEPTEMBER 1998.

0 60 120

SCALE: 1" = 60'

TITLE:

FIGURE 11

SUMMARY OF MERCURY SOIL AND GROUND WATER RESULTS

LOCATION: TROY CHEMICAL CORPORATION, INC. NEWARK, NEW JERSEY

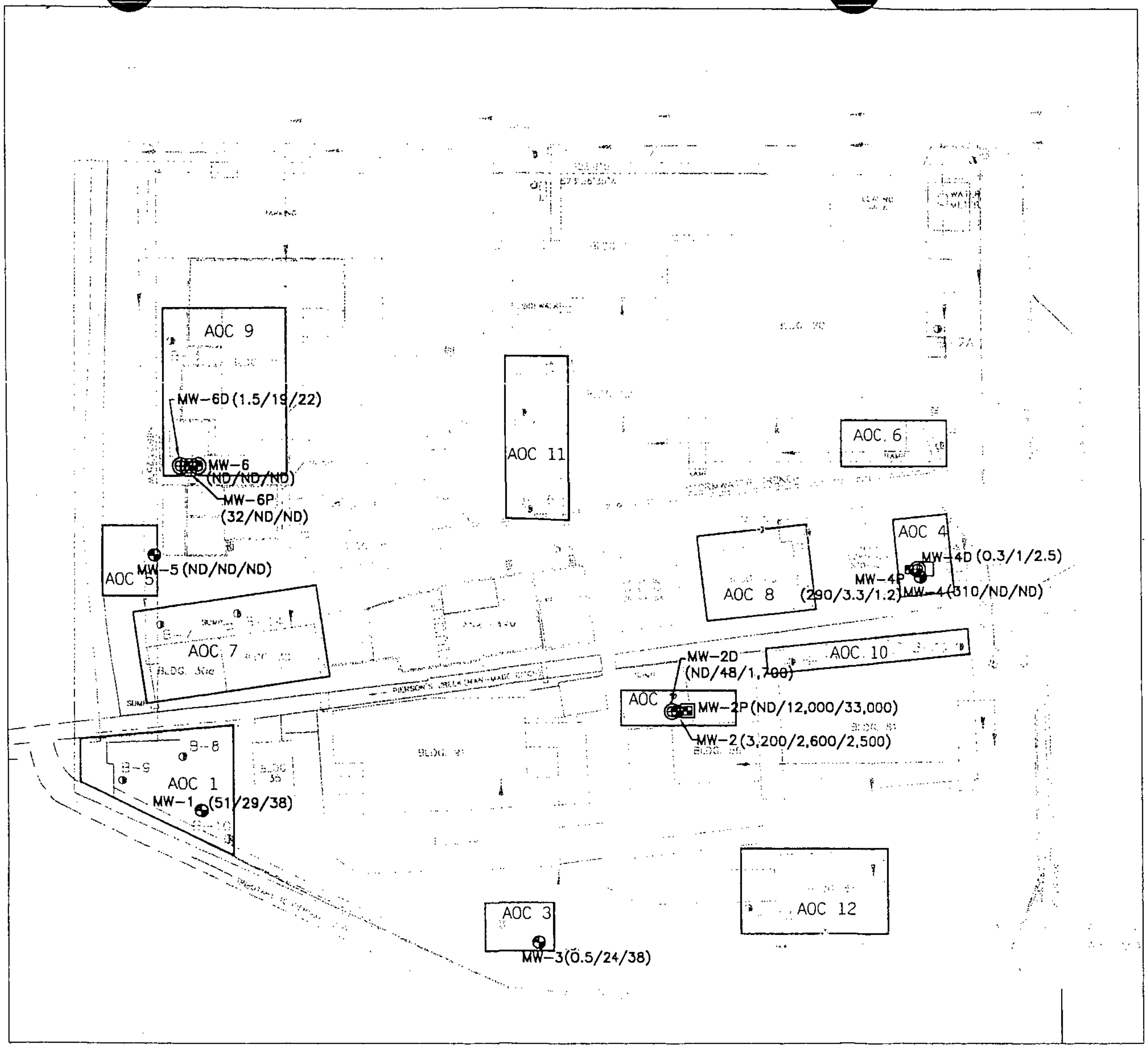
DATE: 7/6/00

PROJECT NO.: 95127

FILENAME: 95127_SOILDATA

ENVIRONMENTAL LIABILITY MANAGEMENT, INC.

932250104



LEGEND:

MW-1	MW-1 MONITORING WELL LOCATION AND ID
MW-6	SHALLOW MONITORING WELL LOCATION AND ID
MW-D	DEEP MONITORING WELL LOCATION AND ID
MW-2P	PEAT MONITORING WELL LOCATION AND ID
(51/29/38)	BENZENE/TRICHLOROETHENE/TETRACHLOROETHENE ANALYTICAL RESULTS IN ug/l
B-1	SOIL BORING LOCATION AND ID
	SANITARY SEWER MANHOLE
	TRENCH DRAIN
	INTERMITTENT DRAINAGE FEATURE
	WATER LINE
	GAS LINE
	PROCESS SEWER
AOC 1	AREA OF CONCERN

NOTES:

SOURCE: EMCON, TROY CHEMICAL CORPORATION, INC., NEWARK, NJ, "SITE INVESTIGATION PLAN", FIGURE: 2, DATE: SEPTEMBER 1998.

0 60 120

SCALE: 1" = 60'

TITLE:
FIGURE 12
SUMMARY OF GROUND WATER SAMPLE BENZENE, TRICHLOROTHENE, AND TETRACHLROETHENE RESULTS

LOCATION:
TROY CHEMICAL CORPORATION, INC.
NEWARK, NEW JERSEY

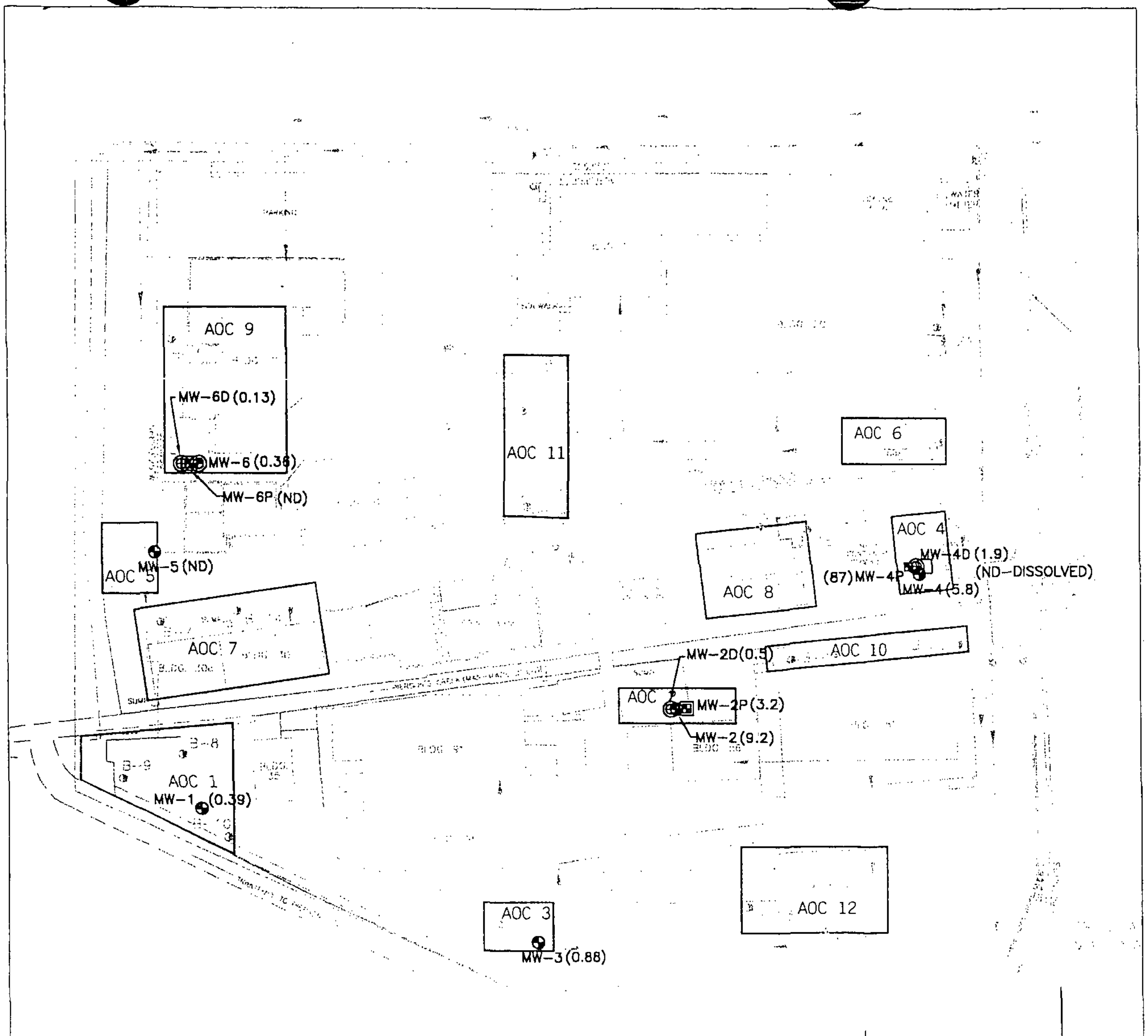
DATE: 7/6/00

PROJECT NO.: 95127

FILENAME: 95127_GWDATA

ENVIRONMENTAL LIABILITY MANAGEMENT, INC.

932250105



LEGEND:

MW-1	MW-1 MONITORING WELL LOCATION AND ID
MW-6	SHALLOW MONITORING WELL LOCATION AND ID
MW-D	DEEP MONITORING WELL LOCATION AND ID
MW-2P	PEAT MONITORING WELL LOCATION AND ID
(87)	ANALYTICAL RESULT IN ug/l
	SOIL BORING LOCATION AND ID
	SANITARY SEWER MANHOLE
	TRENCH DRAIN
	INTERMITTENT DRAINAGE FEATURE
	WATER LINE
	GAS LINE
	PROCESS SEWER
AOC 1	AREA OF CONCERN

NOTES:

SOURCE: EMCON, TROY CHEMICAL CORPORATION, INC., NEWARK, NJ, "SITE INVESTIGATION PLAN", FIGURE: 2, DATE: SEPTEMBER 1998.

0 60 120

SCALE: 1" = 60'

TITLE: FIGURE 13
SUMMARY OF GROUND WATER MERCURY RESULTS

LOCATION: TROY CHEMICAL CORPORATION, INC. NEWARK, NEW JERSEY

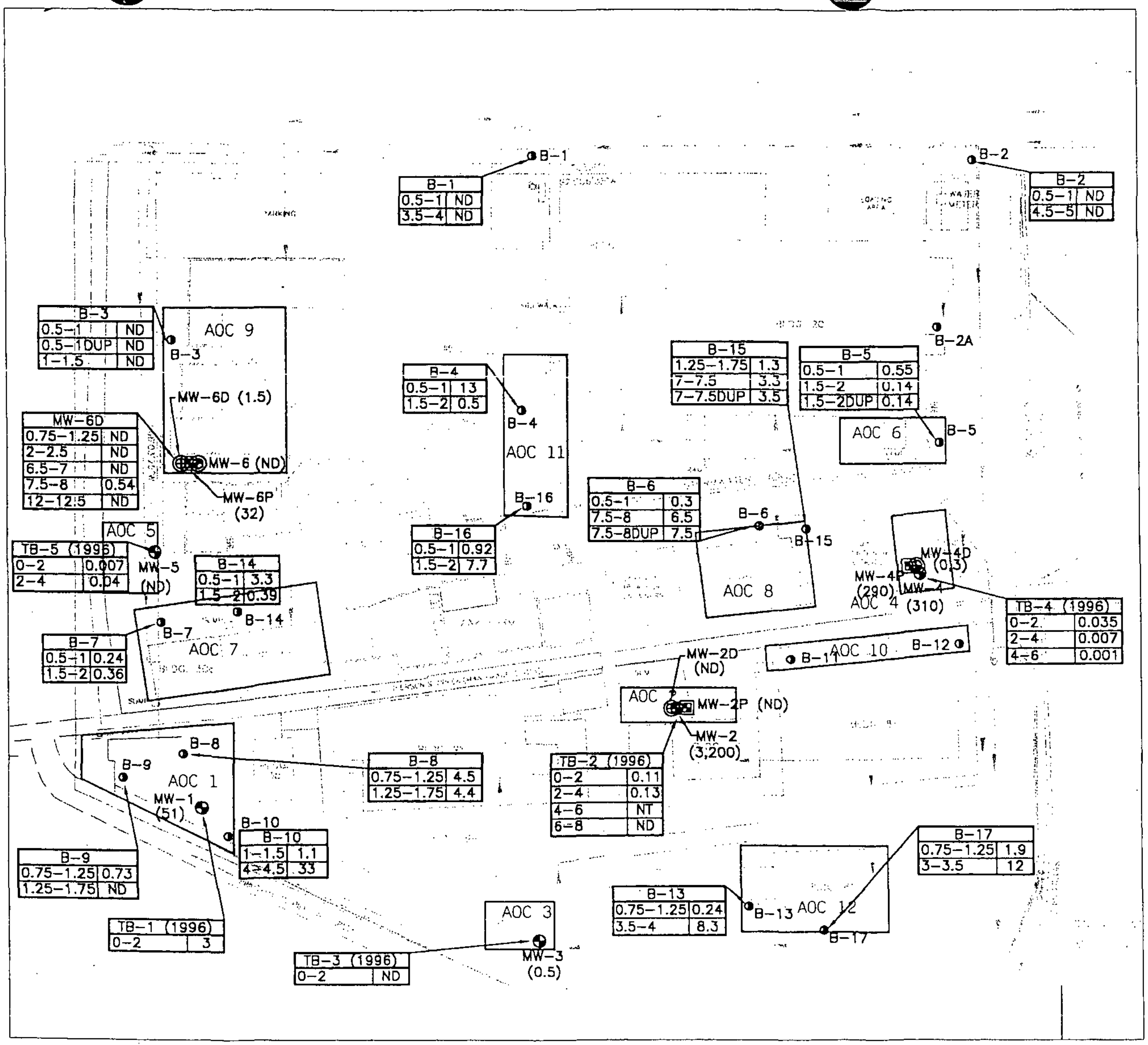
DATE: 7/6/00

PROJECT NO.: 95127

FILENAME: 95127_GWDATA

ELM
ENVIRONMENTAL LIABILITY MANAGEMENT, INC.

932250106



LEGEND:

- MW-1 MONITORING WELL LOCATION AND ID
- MW-6 SHALLOW MONITORING WELL LOCATION AND ID
- MW-D DEEP MONITORING WELL LOCATION AND ID
- MW-2P PEAT MONITORING WELL LOCATION AND ID
- B-1 SOIL BORING LOCATION AND ID
- SANITARY SEWER MANHOLE
- TRENCH DRAIN
- INTERMITTENT DRAINAGE FEATURE
- WATER LINE
- GAS LINE
- PROCESS SEWER
- AOC 1 AREA OF CONCERN

B-5	
0.5-1	9.7
1.5-2	4.8
1.5-2DUP	9.3

SOIL SAMPLE ID, SAMPLE DEPTH (FEET) AND ANALYTICAL RESULT (mg/kg)

(1.5) GROUND WATER ANALYTICAL RESULT (ug/l)
ND NOT DETECTED
NT NOT TESTED

NOTES:

SOURCE: EMCON, TROY CHEMICAL CORPORATION, INC., NEWARK, NJ, "SITE INVESTIGATION PLAN", FIGURE: 2, DATE: SEPTEMBER 1998.

0 60 120
SCALE: 1" = 60'

TITLE: FIGURE 14
SUMMARY OF BENZENE SOIL AND GROUND WATER RESULTS

LOCATION: TROY CHEMICAL CORPORATION, INC. NEWARK, NEW JERSEY

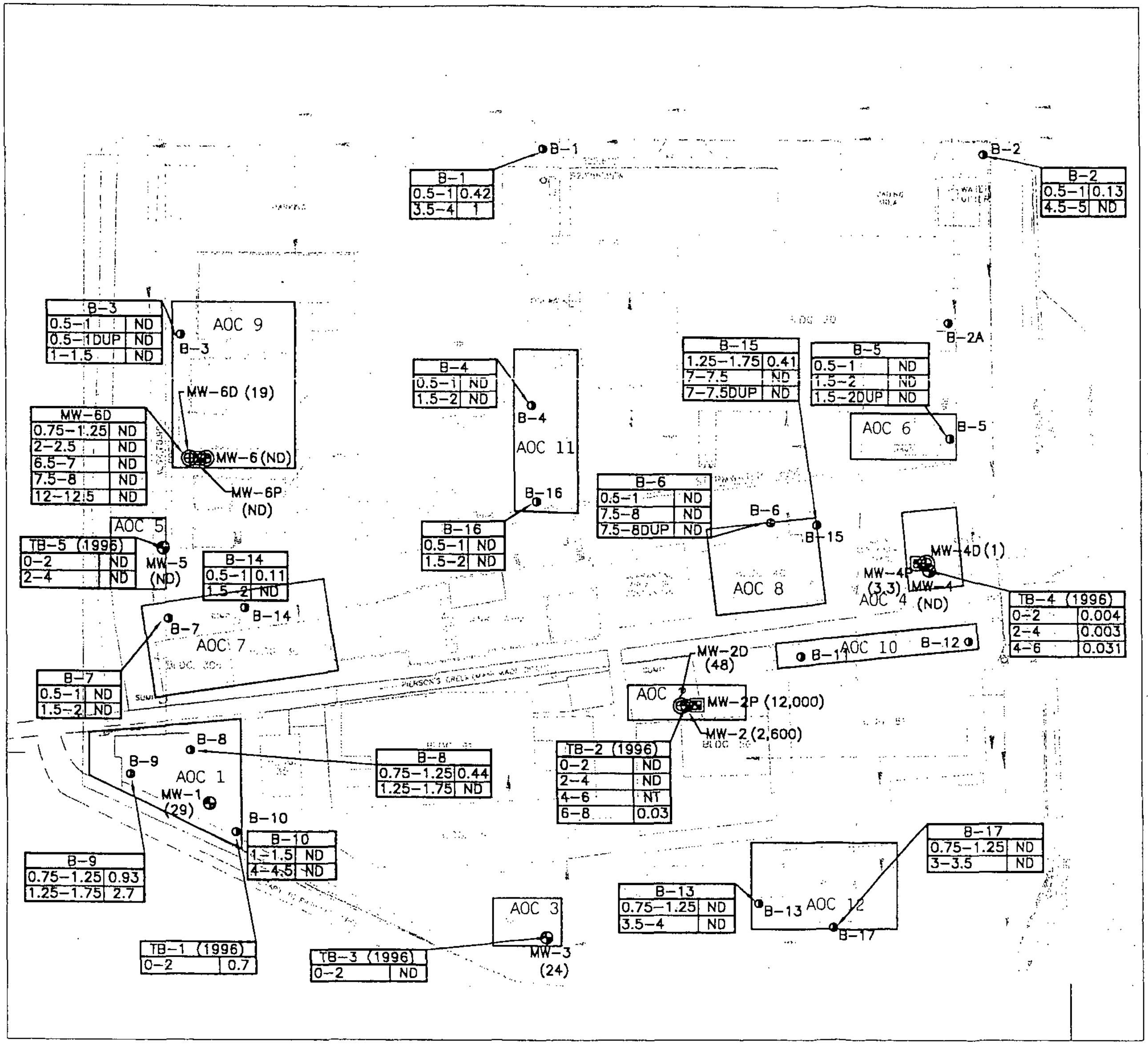
DATE: 7/6/00

PROJECT NO.: 95127

FILENAME: 95127_SOILDATA

ELM
ENVIRONMENTAL LIABILITY MANAGEMENT, INC.
218 Wall Street, Research Park, Princeton, NJ 08540
4920 York Road, Ste. 2CC2, P.O. Box 306, Holicong, PA 18928
1259 Route 46 East, Building 1, First Floor, Parsippany, NJ 07054

932250107



LEGEND:

- MW-1 MONITORING WELL LOCATION AND ID
- MW-6 SHALLOW MONITORING WELL LOCATION AND ID
- MW-D DEEP MONITORING WELL LOCATION AND ID
- MW-2P PEAT MONITORING WELL LOCATION AND ID
- B-1 SOIL BORING LOCATION AND ID
- SANITARY SEWER MANHOLE
- TRENCH DRAIN
- INTERMITTENT DRAINAGE FEATURE
- WATER LINE
- GAS LINE
- PROCESS SEWER
- AOC 1 AREA OF CONCERN

B-5	
0.5-1	9.7
1.5-2	4.8
1.5-2DUP	9.3

SOIL SAMPLE ID, SAMPLE DEPTH (FEET) AND ANALYTICAL RESULT (mg/kg)

- (19) GROUND WATER ANALYTICAL RESULT (ug/l)
- ND NOT DETECTED
- NT NOT TESTED

NOTES:

SOURCE: EMCON, TROY CHEMICAL CORPORATION, INC., NEWARK, NJ, "SITE INVESTIGATION PLAN", FIGURE: 2, DATE: SEPTEMBER 1998.

0 60 120

SCALE: 1" = 60'

TITLE: FIGURE 15

SUMMARY OF TETRACHLOROETHENE SOIL AND GROUND WATER RESULTS

LOCATION: TROY CHEMICAL CORPORATION, INC. NEWARK, NEW JERSEY

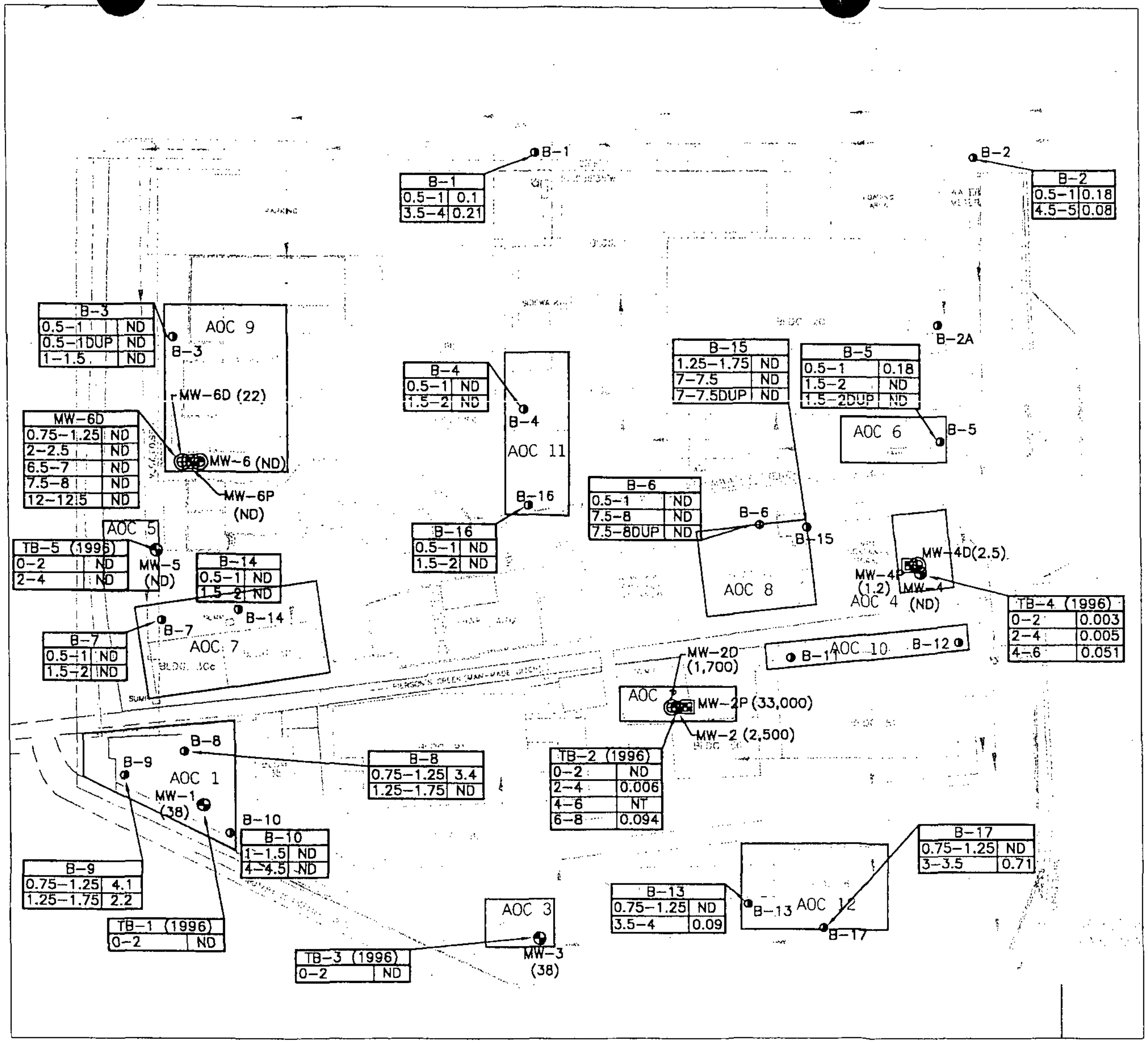
DATE: 7/6/00

PROJECT NO.: 95127

FILENAME: 95127_SOILDATA

ENVIRONMENTAL LIABILITY MANAGEMENT, INC.

932250108



LEGEND:

- MW-1 — MW-1 MONITORING WELL LOCATION AND ID
- MW-6 — SHALLOW MONITORING WELL LOCATION AND ID
- MW-D — DEEP MONITORING WELL LOCATION AND ID
- MW-2P — PEAT MONITORING WELL LOCATION AND ID
- B-1 — SOIL BORING LOCATION AND ID
- SANITARY SEWER MANHOLE
- TRENCH DRAIN
- INTERMITTENT DRAINAGE FEATURE
- WATER LINE
- GAS LINE
- PROCESS SEWER
- AOC 1 — AREA OF CONCERN

B-5	
0.5-1	9.7
1.5-2	4.8
1.5-2DUP	9.3

SOIL SAMPLE ID, SAMPLE DEPTH (FEET) AND ANALYTICAL RESULT (mg/kg)

- (22) — GROUND WATER ANALYTICAL RESULT (ug/l)
- ND — NOT DETECTED
- NT — NOT TESTED

NOTES:

SOURCE: EMCON, TROY CHEMICAL CORPORATION, INC., NEWARK, NJ, "SITE INVESTIGATION PLAN", FIGURE: 2, DATE: SEPTEMBER 1998.

0 60 120

SCALE: 1" = 60'

TITLE: FIGURE 16

SUMMARY OF TRICHLOROETHENE SOIL AND GROUND WATER RESULTS

LOCATION: TROY CHEMICAL CORPORATION, INC. NEWARK, NEW JERSEY

DATE: 7/6/00

PROJECT NO.: 95127

FILENAME: 95127_SOILDATA

ENVIRONMENTAL LIABILITY MANAGEMENT, INC.

932250109

Table 2: Analytical Results for Soil Collected in 1996 Remedial Investigation
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID Date Sampled Sample Depth	TB-1 S-1 10/07/96 0-2'	TB-2 S-1 10/10/96 0-2'	TB-2 S-2 10/10/96 2-4'	TB-2 S-3 10/10/96 4-6'	TB-2 S-4 10/10/96 6-8'	TB-3 S-1 10/08/96 0-2'	TB-4 S-1 10/09/96 0-2'	TB-4 S-2 10/09/96 2-4'	TB-4 S-3 10/09/96 4-6'	TB-5 S-1 10/07/96 0-2'	TB-5 S-2 10/07/96 2-4'
Volatiles (ug/kg)											
Chloromethane	U	U	U		U	U	U	U	U	U	U
Chloroethane	U	U	10 J		U	U	U	U	U	U	U
Methylene Chloride	120 J	U	U		U	U	U	U	U	U	U
Acetone	U	110	120		33	U	200	U	24	150 B	U
Carbon Disulfide	U	U	U		U	U	1 J	U	U	U	4 J
1,1-Dichloroethane	U	U	U		12	U	U	U	1 J	U	U
1,2-Dichloroethene (total)	U	U	U		U	U	2 J	2 J	14	U	U
Chloroform	660 J	U	U		U	U	U	U	U	U	U
2-Butanone	U	U	U		U	20	30	12	U	20	U
1,1,1-Trichloroethane	U	U	U		37	U	U	U	U	U	U
Trichloroethene	U	U	6 J		94	U	3 J	5 J	51	U	U
Dibromochloromethane	U	U	U		U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U		10	U	U	U	U	U	U
Benzene	**3000**	110	130		U	U	35	7	1 J	7	40
2-Hexanone	U	50 J	48 J		U	U	U	U	U	U	U
Tetrachloroethene	700 J	U	U		30	U	4 J	3 J	31	U	U
Toluene	200 J	52	16 J		3 J	U	5 J	2 J	2 J	U	2 J
Chlorobenzene	U	120	47		U	U	9	U	3 J	U	U
Ethylbenzene	U	430	140		U	U	6	1 J	3 J	5 J	3 J
Styrene	U	U	U		U	U	4 J	U	U	U	U
Xylenes (total)	1700	920	310		U	4 J	33	7	12	4 J	7

Table 2: Analytical Results for Soil Collected in 1996 Remedial Investigation
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID	TB-1 S-1	TB-2 S-1	TB-2 S-2	TB-2 S-3	TB-2 S-4	TB-3 S-1	TB-4 S-1	TB-4 S-2	TB-4 S-3	TB-5 S-1	TB-5 S-2
Date Sampled	**10/07/96**	**10/10/96**	**10/10/96**	**10/10/96**	**10/10/96**	**10/08/96**	**10/09/96**	**10/09/96**	**10/09/96**	**10/07/96**	**10/07/96**
Sample Depth	**0-2'**	**0-2'**	**2-4'**	**4-6'**	**6-8'**	**0-2'**	**0-2'**	**2-4'**	**4-6'**	**0-2'**	**2-4'**
Semivolatiles (ug/kg)											
1,4-Dichlorobenzene	U			U	U	200 J					
1,2-Dichlorobenzene	U			U	U	120 J					
4-Methylphenol	U			U	U	110 J					
Benzoic acid	U			U	U	540 J					
1,2,4-Trichlorobenzene	U			U	U	U					
Naphthalene	52,000			120 J	10 J	1,500 J					
4-Chloroaniline	U			U	U	170 J					
2-Methylnaphthalene	49,000			100 J	U	190 J					
2,4,5-Trichlorophenol	16,000 J			U	U	U					
Acenaphthene	11,000			15 J	U	340 J					
Dibenzofuran	12,000			15 J	U	230 J					
Fluorene	**16,000**			32 J	U	260 J					
N-Nitrosodiphenylamine	1,700 J			U	U	15,000					
Pentachlorophenol	4,100 J			U	U	U					
Phenanthrene	73,000			160 J	56 J	2,000 J					
Anthracene	20,000			820	58 J	400 J					
Fluoranthene	55,000			220 J	57 J	3,300					
Pyrene	30,000			170 J	46 J	2,100 J					
Butylbenzylphthalate	1,500 J			U	U	U					
Benzo(a)anthracene	24,000			100 J	27 J	1,900 J					
Chrysene	25,000			140 J	28 J	2,100 J					
bis(2-Ethylhexyl)phthalate	21,000			83 J	130 J	480 J					
Benzo(b)fluoranthene	18,000			120 J	21 J	2,400					
Benzo(k)fluoranthene	16,000			72 J	18 J	2,500					
Benzo(a)pyrene	21,000			120 J	26 J	2,000 J					
Indeno(1,2,3-cd)pyrene	3,800 J			56 J	13 J	550 J					
Dibenzo(a,h)anthracene	1,400 J			18 J	U	U					
Benzo(g,h,i)perylene	3,000 J			54 J	14 J	520 J					

Table 2: Analytical Results for Soil Samples Collected in 1996 Remedial Investigation
Troy Chemical Corporation Inc.
Newark, New Jersey

Sample ID Date Sampled Sample Depth	TB-1 S-1 10/07/96 0-2'	TB-1 S-2 10/07/96 2-4'	TB-1 S-3 10/07/96 4-6'	TB-1 S-4 10/07/96 6-8'	TB-2 S-1 10/10/96 0-2'	TB-2 S-2 10/10/96 2-4'	TB-2 S-3 10/10/96 4-6'	TB-2 S-4 10/10/96 6-8'	TB-3 S-1 10/08/96 0-2'	TB-3 S-2 10/08/96 2-4'	TB-3 S-3 10/08/96 4-6'	TB-3 S-4 10/08/96 6-8'
Inorganic Elements(mg/kg)												
Aluminum	4630 J	3400 J	7750 J	8030 J	4970	4660	4670	8080	6440 J	1170 J	15700 J	5080 J
Antimony	11.0	3.0 J	3.2 J	2.5	1.0 J	1.8 J	1.2 J	1.3 J	6.5 J	1.4	5.4 J	1.6
Arsenic	**22.5** J	**29.2** J	**187** J	**859** J	**98.3**	**25.7**	**33.4**	1.4 J	**179** J	**25.8** J	**212** J	**266** J
Barium	318.0 J	72.3 J	145 J	75.2 J	53.5	212	39.5 J	167	127 J	35.4 J	76.9 J	99.7 J
Beryllium	0.82	0.23	0.44 J	0.42	0.25 J	0.25 J	0.21	0.47 J	0.28 J	0.24	0.63 J	0.29 J
Cadmium	27.1 J	8.8 J	4.5 J	3.5 J	0.92 J	2.8 J	0.80 J	1.9 J	2.5 J	0.55 J	8.5 J	0.69 J
Calcium	18300	7760	4000	7120	5150	15600	4710	1830	4880	542	3760	4020
Chromium	47.0 J	50.0 J	77.3 J	43.4 J	9.6	20.3	7.3	14.0	68.9 J	6.1 J	100 J	7.6 J
Cobalt	570	21.9	8.8 J	10.0 J	4.0 J	6.4 J	3.5 J	8.7 J	10.9 J	1.8 J	15.7	1.6 J
Copper	**694** J	221 J	120 J	46.6 J	57.4 J	39.8 J	12.6 J	13.3 J	289 J	48.7 J	166 J	10.3 J
Iron	54700 J	26400 J	22800 J	13900 J	7600	6760	4210	13000	13300 J	2470 J	81500 J	5660 J
Lead	**2470** J	256 J	587 J	104 J	77.5 J	558 J	45.0 J	9.3 J	**739** J	73.9 J	406 J	21.8 J
Magnesium	3160	1450	2870	1840	1310	1680	998.	4870	1590	74.0 J	383	1370
Manganese	2040 J	453 J	267 J	386 J	151 J	118 J	73.6 J	292 J	159 J	16.5 J	377 J	96.0 J
Mercury	**4290**	**1700**	65.2	**282**	67.8 J	74.3 J	28.1 J	1.5 J	114	1.0	164	52.8
Nickel	92.9 J	40.3 J	21.8 J	14.7 J	6.4 J	11.2	5.1 J	19.7	14.7 J	4.9 J	23.9 J	3.9 J
Potassium	918	207 J	932	562	488	446	309	1320	319	56.6 J	1380	228 J
Selenium	6.6	4.2	4.1	3.4	1.9 J	0.84 J	1.5 J	2.0 J	3.3	1.0 J	8.5	1.7
Silver	48.4	25.9	1.2 J	6.6	0.17	0.44 J	0.21	0.21	2.2 J	0.24	1.1 J	0.96 J
Sodium	U	215 J	1240 J	2380 J	195	403	1120	1590	602 J	190 J	3780 J	1200 J
Thallium	1.9	U	2.0	U	U	U	U	U	U	U		U
Vanadium	36.5	30.8	28.3	18.2 J	10.4	10.3	7.9 J	16.9	26.2	11.8	13.8	10.7 J
Zinc	721 J	252 J	1140 J	169 J	93.9	364	55.8	49.9	549 J	163 J	312 J	21.1 J
Classical Chemistry												
Bromide (mg/kg)	47.0	48.1	53.4	91.2	47.2	52.2	49.6	47.9	53.7	55.2	54.5	59.7
Iodide (mg/kg)	47.0	48.1	53.4	91.2	47.2	52.2	49.6	47.9	53.7	55.2	54.5	59.7
Hydrous Metal Oxide (%)	16.7%	10.7%	32.1%	8.82%	9.68%	8.57%	30.0%	46.9%	2.86%	2.00%	2.94%	18.2%
Chloride (mg/kg)	128	1510	78.9	287	179	373	472	277	108	58.4	64.9	242
pH (S.U.)	9.83	9.95	7.72	8.01	10.9	11.6	10.4	7.92	7.90	7.89	7.52	6.68
Organic Carbon (mg/kg)	121,000	160,000	160,000	108,000	7860	92,900	11,600	2420	160,000	160,000	136,000	21,300

Table 2: Analytical Results for Soil Samples Collected in 1996 Remedial Investigation
Troy Chemical Corporation Inc.
Newark, New Jersey

Sample ID Date Sampled Sample Depth	TB-4 S-1 10/09/96 0-2'	TB-4 S-2 10/09/96 2-4'	TB-4 S-3 10/09/96 4-6'	TB-4 S-4 10/09/96 6-8'	TB-4 S-5 10/09/96 8-10'	TB-5 S-1 10/07/96 0-2'	TB-5 S-2 10/07/96 2-4'	TB-5 S-3 10/07/96 4-6'	TB-5 S-4 10/07/96 6-8'
Inorganic Elements(mg/kg)									
Aluminum	4060 J	4990 J	4020 J	5250 J	9450	5770 J	6190 J	13600 J	4310 J
Antimony	7.5 J	3.5 J	8.4 J	44.3	1.4 J	5.2 J	11.3 J	1.4	1.2
Arsenic	18.1 J	**49.4** J	18.1 J	**20.2** J	**80**	13.1 J	**65.9** J	**28.9** J	**26.3** J
Barium	106 J	81.3 J	92.2 J	159 J	28.7 J	125 J	3380 J	75.7 J	39.2 J
Beryllium	0.38 J	0.89 J	0.35 J	0.30 J	0.27 J	0.26 J	0.38 J	0.42 J	0.20
Cadmium	3.9 J	2.5 J	3.7 J	7.0 J	0.72 J	3.2 J	87.8 J	1.3 J	0.75 J
Calcium	15900	25600	27100	23000	1140	16000	14600	2080	1320
Chromium	35.3 J	27.1 J	28.2 J	82.0 J	21.7	56.7 J	798 J	52.2 J	17.5 J
Cobalt	26.2	13.3	16.8	4.6 J	3.0 J	21.5	25.7	4.5 J	2.7 J
Copper	211 J	112 J	143. J	190 J	11.7 J	129 J	842 J	35.2 J	19.0 J
Iron	14200 J	10800 J	13400 J	13800 J	4230	**24500** J	20800 J	8250 J	4430 J
Lead	**768** J	588 J	546 J	**1810** J	29.6 J	430 J	**10800** J	103 J	40.2 J
Magnesium	2580	3070	3080	1570	1250	2290	2630	408	300
Manganese	237 J	202 J	318 J	196 J	31.0 J	180 J	214 J	48.0 J	20.5 J
Mercury	**2240**	**713**	**957**	43.8	0.58 J	256.	114	5.8	1.7
Nickel	39.8 J	21.0 J	26.0 J	36.4 J	11.9	38.3 J	47.7 J	6.9 J	5.2 J
Potassium	318	306		470	428	1000	720	731	262
Selenium	1.8	2.5	2.5	3.5	2.1 J	3.0	3.0	2.4	1.6
Silver	5.1	5.8	5.8	4.5	U	4.7	8.5	U	U
Sodium	457 J	570 J	601 J	803 J	753	551 J	1200 J	2690 J	1560 J
Thallium	U	U	U	U	U	U	U	U	U
Vanadium	20.9	17.5	25.4	75.7	20.6	26.6	59.1	18.6	9.7 J
Zinc	447 J	251 J	296 J	347 J	87.3	277 J	3990 J	113 J	63.8 J
Classical Chemistry									
Bromide (mg/kg)	44.3	45.3	47.2	58.5	51.5	45.4	54.7	54.6	53.4
Iodide (mg/kg)	44.3	45.3	47.2	58.5	51.5	45.4	54.7	197	193
Hydrous Metal Oxide (%)	10.3%	6.06%	9.38%	21.4%	21.9%	14.9%	52.8%	0.139	14.8%
Chloride (mg/kg)	32.7	54.3	110	451	167	59.1	390	1360	1000
pH (S.U.)	8.93	9.46	9.02	9.40	7.90	10.6	8.45	7.76	7.58
Organic Carbon (mg/kg)	77,100	49,000	60,800	102,000	16,300	160,000	160,000	160,000	160,000

Table 6: Ground Water Analytical Results for May 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID Lab Sample Number Sampling Date Matrix Dilution Factor Units	New Jersey Higher of PQLs and Ground Water Quality Criteria (ug/l)	MW-1 202222 05/03/00 WATER 1.0 ug/L	MW-2 202221 05/03/00 WATER 25.0 ug/L	MW-2P 202219 05/03/00 WATER 250.0 ug/L	MW-2D 202220 05/03/00 WATER 20.0 ug/L	MW-3 202223 05/03/00 WATER 1.0 ug/L	MW-4 202216 05/03/00 WATER 2.0 ug/L	MW-4P 202229 05/03/00 WATER 2.0 ug/L	MW-4D 202217 05/03/00 WATER 1.0 ug/L
VOLATILE COMPOUNDS (GC/MS)									
Chloromethane	30	0.5 U	13 U	*130 U*	10 U	0.5 U	1.0 U	1.0 U	0.5 U
Bromomethane	10	0.3 U	8.5 U	*85 U*	6.8 U	0.3 U	0.7 U	0.7 U	0.3 U
VinylChloride	5	0.7 U	**250**	*160 U*	*13 U*	0.7 U	1.3 U	**8.4**	0.7 U
Chloroethane	NA	0.4 U	820	110 U	8.8 U	0.4 U	0.9 U	0.9 U	0.4 U
MethyleneChloride	3*	0.8 U	*21 U*	*210 U*	*17 U*	0.8 U	1.7 U	1.7 U	0.8 U
Trichlorofluoromethane	NA	0.3 U	7.2 U	72 U	5.8 U	0.3 U	0.6 U	0.6 U	0.3 U
1,1-Dichloroethene	2	0.4 U	**690**	**230**	**120**	0.4 U	0.8 U	0.8 U	0.4 U
1,1-Dichloroethane	50*	5.1	**820**	**2000**	46	3.2	0.7 U	0.7 U	0.4 U
trans-1,2-Dichloroethene	100	0.4 U	24	*110 U*	8.8 U	0.4 U	0.9 U	0.9 U	0.4 U
cis-1,2-Dichloroethene	70*	0.4 U	**2700**	*98 U*	7.8 U	0.4 U	0.8 U	7.8	0.4 U
Chloroform	6	0.2 U	**6.4**	*58 U*	4.6 U	0.2 U	2.3	0.5 U	0.2 U
1,2-Dichloroethane	2	0.2 U	*6.0 U*	*60 U*	*4.8 U*	0.2 U	0.5 U	0.5 U	0.2 U
1,1,1-Trichloroethane	30	0.3 U	**3000**	*82 U*	**1000**	0.3 U	0.7 U	0.7 U	0.5
CarbonTetrachloride	2	0.4 U	*11 U*	*110 U*	*8.6 U*	0.4 U	0.9 U	0.9 U	0.4 U
Bromodichloromethane	1	0.2 U	*4.0 U*	*40 U*	*3.2 U*	0.2 U	0.3 U	0.3 U	0.2 U
1,2-Dichloropropane	1	0.2 U	*6.2 U*	*62 U*	*5.0 U*	0.2 U	0.5 U	0.5 U	0.2 U
Trichloroethene	1	**29**	**2600**	**12000**	**48**	**24**	0.8 U	**3.3**	1.0
Dibromochloromethane	10	0.2 U	4.5 U	*45 U*	3.6 U	0.2 U	0.4 U	0.4 U	0.2 U
1,1,2-Trichloroethane	3	0.3 U	*7.5 U*	*75 U*	*6.0 U*	0.3 U	0.6 U	0.6 U	0.3 U
Benzene	1	**51**	**3200**	*65 U*	*5.2 U*	0.5	**310**	**290**	0.3
2-ChloroethylVinylEther	NA	0.5 U	13 U	130 U	10 U	0.5 U	1.0 U	1.0 U	0.5 U
Bromoform	4	0.1 U	3.2 U	*32 U*	2.6 U	0.1 U	0.3 U	0.3 U	0.1 U
Tetrachloroethene	1	**38**	**2500**	**33000**	**1700**	**38**	0.6 U	**1.2**	**2.5**
1,1,2,2-Tetrachloroethane	1*	0.1 U	3.5 U	*35 U*	2.8 U	0.1 U	0.3 U	0.3 U	0.1 U
Toluene	1,000	0.3	23	75 U	30	0.3 U	0.6 U	2.9	0.3 U
Chlorobenzene	50*	2.8	5.8 U	*58 U*	4.6 U	0.2 U	0.5 U	0.5 U	0.2 U
Ethylbenzene	700	0.3 U	13	65 U	5.2 U	0.3 U	1.9	2.6	0.3 U
Xylene(Total)	1000*	0.3 U	9.4	78 U	6.2 U	0.3 U	0.6 U	2.8	0.3 U
(1) cis-1,3-Dichloropropene	NA	0.1 U	2.8 U	28 U	2.2 U	0.1 U	0.2 U	0.2 U	0.1 U
(1) trans-1,3-Dichloropropene	NA	0.3 U	8.2 U	82 U	6.6 U	0.3 U	0.7 U	0.7 U	0.3 U
Total Confident Conc. VOAs (s)		126	16656	47230	2944	66	314	319	4.3
Total Estimated Conc. VOA TICs (s)		7.2	83	0	0	3.1	28	945	0

(1) Values listed reflect the combined standards for the cis and trans isomers of 1,3-Dichloropropene.

* Value is a revision to the Class IIA ground water quality standard based upon the November 18, 1996 Safe Drinking Water Act MCL changes and a February 5, 1997 policy memo.

Qualifiers

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

NR - Not analyzed.

* During the sampling, the sample for MW-6 was labelled MW-6P and vice versa.

Table 6: Ground Water Analytical Results for May 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID Lab Sample Number Sampling Date Matrix Dilution Factor Units	New Jersey Higher of PQLs and Ground Water Quality Criteria (ug/l)	MW-4D_Dup 202218 05/03/00 WATER 1.0 ug/L	MW-4D-Diss 202232 05/03/00 WATER	MW-5 202224 05/03/00 WATER 5.0 ug/L	MW-6* 202225 05/03/00 WATER 20.0 ug/L	MW-6P* 202228 05/03/00 WATER 500.0 ug/L	MW-6D 202226 05/03/00 WATER 5.0 ug/L	MW-6D_Dup 202227 05/03/00 WATER 5.0 ug/L	Trip_Blank 202230 05/02/00 WATER 1.0 ug/L
VOLATILE COMPOUNDS (GC/MS)									
Chloromethane	30	0.5 U	NR	2.6 U	10 U	260 U	2.6 U	2.6 U	0.5 U
Bromomethane	10	0.3 U	NR	1.7 U	6.8 U	170 U	1.7 U	1.7 U	0.3 U
VinylChloride	5	0.7 U	NR	3.2 U	13 U	320 U	3.2 U	3.2 U	0.7 U
Chloroethane	NA	0.4 U	NR	2.2 U	8.8 U	220 U	2.2 U	2.2 U	0.4 U
MethyleneChloride	3^	0.8 U	NR	4.2 U	17 U	420 U	4.2 U	4.2 U	0.8 U
Trichlorofluoromethane	NA	0.3 U	NR	1.4 U	5.8 U	140 U	1.4 U	1.4 U	0.3 U
1,1-Dichloroethene	2	0.4 U	NR	2.0 U	8.2 U	200 U	2.0 U	2.0 U	0.4 U
1,1-Dichloroethane	50^	0.4 U	NR	1.8 U	7.4 U	180 U	1.8 U	1.8 U	0.4 U
trans-1,2-Dichloroethene	100	0.4 U	NR	2.2 U	8.8 U	220 U	2.2 U	2.2 U	0.4 U
cis-1,2-Dichloroethene	70^	0.4 U	NR	2.0 U	7.8 U	200 U	2.0 U	2.0 U	0.4 U
Chloroform	6	0.2 U	NR	1.2 U	4.6 U	120 U	1.2 U	1.2 U	0.2 U
1,2-Dichloroethane	2	0.2 U	NR	1.2 U	4.8 U	120 U	1.2 U	1.2 U	0.2 U
1,1,1-Trichloroethane	30	0.5	NR	1.6 U	6.6 U	160 U	1.6 U	1.6 U	0.3 U
CarbonTetrachloride	2	0.4 U	NR	2.2 U	8.6 U	220 U	2.2 U	2.2 U	0.4 U
Bromodichloromethane	1	0.2 U	NR	0.8 U	3.2 U	80 U	0.8 U	0.8 U	0.2 U
1,2-Dichloropropane	1	0.2 U	NR	1.2 U	5.0 U	120 U	1.2 U	1.2 U	0.2 U
Trichloroethene	1	0.9	NR	2.0 U	8.2 U	200 U	**19**	**19**	0.4 U
Dibromochloromethane	10	0.2 U	NR	0.9 U	3.6 U	90 U	0.9 U	0.9 U	0.2 U
1,1,2-Trichloroethane	3	0.3 U	NR	1.5 U	6.0 U	150 U	1.5 U	1.5 U	0.3 U
Benzene	1	0.3	NR	1.3 U	**32**	130 U	**1.5**	**1.4**	0.3 U
2-ChloroethylVinylEther	NA	0.5 U	NR	2.6 U	10 U	260 U	2.6 U	2.6 U	0.5 U
Bromoform	4	0.1 U	NR	0.7 U	2.6 U	65 U	0.7 U	0.7 U	0.1 U
Tetrachloroethene	1	**2.2**	NR	1.6 U	6.4 U	160 U	**22**	**22**	0.3 U
1,1,2,2-Tetrachloroethane	1^	0.1 U	NR	0.7 U	2.8 U	70 U	0.7 U	0.7 U	0.1 U
Toluene	1,000	0.3 U	NR	1.5 U	17	150 U	1.5 U	1.5 U	0.3 U
Chlorobenzene	50^	0.2 U	NR	1.2 U	36	120 U	1.2 U	1.2 U	0.2 U
Ethylbenzene	700	0.3 U	NR	1.3 U	18	130 U	1.3 U	1.3 U	0.3 U
Xylene(Total)	1000^	0.3 U	NR	1.6 U	170	160 U	1.5 J	1.4 J	0.3 U
(1) cis-1,3-Dichloropropene	NA	0.1 U	NR	0.6 U	2.2 U	55 U	0.6 U	0.6 U	0.1 U
(1) trans-1,3-Dichloropropene	NA	0.3 U	NR	1.6 U	6.6 U	160 U	1.6 U	1.6 U	0.3 U
Total Confident Conc. VOAs (s)		3.9		0	273	0	43	42	0
Total Estimated Conc. VOA TICs (s)		0		2100	7601	130000	1100	1200	0

(1) Values listed reflect the combined standards for the cis and trans isomers of 1,3-Dichloropropene.
^ Value is a revision to the Class IIA ground water quality standard based upon the November 18, 1996 Safe Drinking Water Act MCL changes and a February 5, 1997 policy memo.

Qualifiers

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J - *Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero.* The concentration given is an approximate value.
B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
NR - Not analyzed.

* During the sampling, the sample for MW-6 was labelled MW-6P and vice versa.

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Table 6: Ground Water Analytical Results for May 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID Lab Sample Number Sampling Date Matrix Dilution Factor Units	New Jersey Higher of PQLs and Ground Water Quality Criteria (ug/l)	MW-1 202222 05/03/00 WATER	MW-2 202221 05/03/00 WATER	MW-2P 202219 05/03/00 WATER	MW-2D 202220 05/03/00 WATER	MW-3 202223 05/03/00 WATER	MW-4 202216 05/03/00 WATER	MW-4P 202229 05/03/00 WATER	MW-4D 202217 05/03/00 WATER
SEMIVOLATILE COMPOUNDS (GC/MS)									
Phenol	4,000	NR	NR	NR	NR	NR	NR	NR	NR
2-Chlorophenol	40	NR	NR	NR	NR	NR	NR	NR	NR
2-Nitrophenol	NA	NR	NR	NR	NR	NR	NR	NR	NR
2,4-Dimethylphenol	100	NR	NR	NR	NR	NR	NR	NR	NR
2,4-Dichlorophenol	20	NR	NR	NR	NR	NR	NR	NR	NR
4-Chloro-3-methylphenol	NA	NR	NR	NR	NR	NR	NR	NR	NR
2,4,6-Trichlorophenol	20	NR	NR	NR	NR	NR	NR	NR	NR
2,4-Dinitrophenol	40	NR	NR	NR	NR	NR	NR	NR	NR
4-Nitrophenol	NA	NR	NR	NR	NR	NR	NR	NR	NR
4,6-Dinitro-2-methylphenol	NA	NR	NR	NR	NR	NR	NR	NR	NR
Pentachlorophenol	1	NR	NR	NR	NR	NR	NR	NR	NR
N-Nitrosodimethylamine	20	NR	NR	NR	NR	NR	NR	NR	NR
bis(2-Chloroethyl)ether	10	NR	NR	NR	NR	NR	NR	NR	NR
1,3-Dichlorobenzene	600	NR	NR	NR	NR	NR	NR	NR	NR
1,4-Dichlorobenzene	75	NR	NR	NR	NR	NR	NR	NR	NR
1,2-Dichlorobenzene	600	NR	NR	NR	NR	NR	NR	NR	NR
bis(2-chloroisopropyl)ether	300	NR	NR	NR	NR	NR	NR	NR	NR
N-Nitroso-di-n-propylamine	20	NR	NR	NR	NR	NR	NR	NR	NR
Hexachloroethane	NA	NR	NR	NR	NR	NR	NR	NR	NR
Nitrobenzene	NA	NR	NR	NR	NR	NR	NR	NR	NR
Isophorone	100	NR	NR	NR	NR	NR	NR	NR	NR
bis(2-Chloroethoxy)methane	NA	NR	NR	NR	NR	NR	NR	NR	NR
1,2,4-Trichlorobenzene	9	NR	NR	NR	NR	NR	NR	NR	NR
Naphthalene	300*	NR	NR	NR	NR	NR	NR	NR	NR
Hexachlorobutadiene	1	NR	NR	NR	NR	NR	NR	NR	NR
Hexachlorocyclopentadiene	50	NR	NR	NR	NR	NR	NR	NR	NR
2-Chloronaphthalene	NA	NR	NR	NR	NR	NR	NR	NR	NR
Dimethylphthalate	NA	NR	NR	NR	NR	NR	NR	NR	NR
Acenaphthylene	NA	NR	NR	NR	NR	NR	NR	NR	NR
(1) 2,6-Dinitrotoluene	NA	NR	NR	NR	NR	NR	NR	NR	NR
Acenaphthene	400	NR	NR	NR	NR	NR	NR	NR	NR
(1) 2,4-Dinitrotoluene	10	NR	NR	NR	NR	NR	NR	NR	NR

(1) Values listed reflect the combined standards for the 2,4/2,6-Dinitrotoluene mixture.
* Value is a revision to the Class IIA ground water quality standard based upon the November 18, 1996 Safe Drinking Water Act MCL changes and a February 5, 1997 policy memo.

Qualifiers
U - The compound was not detected at the indicated concentration.
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.
B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
NR - Not analyzed.
* During the sampling, the sample for MW-6 was labelled MW-6P and vice versa.

932250116

Table 6: Ground Water Analytical Results for May 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID Lab Sample Number Sampling Date Matrix Dilution Factor Units		New Jersey Higher of PQLs and Ground Water Quality Criteria (ug/l)	MW-4D_Dup 202218 05/03/00 WATER	MW-4D-Diss 202232 05/03/00 WATER	MW-5 202224 05/03/00 WATER	MW-6P 202225 05/03/00 WATER 5.0 ug/L	MW-6 202228 05/03/00 WATER	MW-6D 202226 05/03/00 WATER 2.0 ug/L	MW-6D_Dup 202227 05/03/00 WATER 2.0 ug/L	Trip_Blank 202230 05/02/00 WATER
SEMIVOLATILE COMPOUNDS (GC/MS)										
	Phenol	4,000	NR	NR	NR	4.8 U	NR	6.9	6.0	NR
	2-Chlorophenol	40	NR	NR	NR	9.4 U	NR	3.8 U	3.8 U	NR
	2-Nitrophenol	NA	NR	NR	NR	8.4 U	NR	3.4 U	3.4 U	NR
	2,4-Dimethylphenol	100	NR	NR	NR	6.4 U	NR	2.6 U	2.6 U	NR
	2,4-Dichlorophenol	20	NR	NR	NR	6.4 U	NR	2.6 U	2.6 U	NR
	4-Chloro-3-methylphenol	NA	NR	NR	NR	9.6 U	NR	3.9 U	3.9 U	NR
	2,4,6-Trichlorophenol	20	NR	NR	NR	3.2 U	NR	1.3 U	1.3 U	NR
	2,4-Dinitrophenol	40	NR	NR	NR	5.6 U	NR	2.3 U	2.3 U	NR
	4-Nitrophenol	NA	NR	NR	NR	4.8 U	NR	2.0 U	2.0 U	NR
	4,6-Dinitro-2-methylphenol	NA	NR	NR	NR	6.5 U	NR	2.6 U	2.6 U	NR
	Pentachlorophenol	1	NR	NR	NR	*8.2 U*	NR	*3.3 U*	*3.4 U*	NR
	N-Nitrosodimethylamine	20	NR	NR	NR	2.4 U	NR	1.0 U	1.0 U	NR
	bis(2-Chloroethyl)ether	10	NR	NR	NR	5.6 U	NR	2.3 U	2.3 U	NR
	1,3-Dichlorobenzene	600	NR	NR	NR	2.9 U	NR	1.2 U	1.2 U	NR
	1,4-Dichlorobenzene	75	NR	NR	NR	3.0 U	NR	1.2 U	1.2 U	NR
	1,2-Dichlorobenzene	600	NR	NR	NR	2.8 U	NR	1.1 U	1.1 U	NR
	bis(2-chloroisopropyl)ether	300	NR	NR	NR	5.3 U	NR	2.1 U	2.2 U	NR
	N-Nitroso-di-n-propylamine	20	NR	NR	NR	4.2 U	NR	1.7 U	1.7 U	NR
	Hexachloroethane	NA	NR	NR	NR	3.4 U	NR	1.4 U	1.4 U	NR
	Nitrobenzene	NA	NR	NR	NR	4.2 U	NR	1.7 U	1.7 U	NR
	Isophorone	100	NR	NR	NR	4.4 U	NR	1.8 U	1.8 U	NR
	bis(2-Chloroethoxy)methane	NA	NR	NR	NR	4.6 U	NR	1.8 U	1.9 U	NR
	1,2,4-Trichlorobenzene	9	NR	NR	NR	2.9 U	NR	1.2 U	1.2 U	NR
	Naphthalene	300^	NR	NR	NR	7.4	NR	1.6 U	1.6 U	NR
	Hexachlorobutadiene	1	NR	NR	NR	*2.9 U*	NR	*1.2 U*	*1.2 U*	NR
	Hexachlorocyclopentadiene	50	NR	NR	NR	4.6 U	NR	1.9 U	1.9 U	NR
	2-Chloronaphthalene	NA	NR	NR	NR	3.9 U	NR	1.6 U	1.6 U	NR
	Dimethylphthalate	NA	NR	NR	NR	2.4 U	NR	1.0 U	1.0 U	NR
	Acenaphthylene	NA	NR	NR	NR	2.4 U	NR	1.0 U	1.0 U	NR
(1)	2,6-Dinitrotoluene	NA	NR	NR	NR	3.4 U	NR	1.4 U	1.4 U	NR
	Acenaphthene	400	NR	NR	NR	2.9 U	NR	1.2 U	1.2 U	NR
(1)	2,4-Dinitrotoluene	10	NR	NR	NR	2.9 U	NR	1.2 U	1.2 U	NR

(1) Values listed reflect the combined standards for the 2,4/2,6-Dinitrotoluene mixture.
^ Value is a revision to the Class IIA ground water quality standard based upon the November 18, 1996 Safe Drinking Water Act MCL changes and a February 5, 1997 policy memo.

Qualifiers
- U - The compound was not detected at the indicated concentration.
- J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.
- B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
- NR - Not analyzed.

* During the sampling, the sample for MW-6 was labelled MW-6P and vice versa.

932250117

Table 6: Ground Water Analytical Results for May 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID Lab Sample Number Sampling Date Matrix Dilution Factor Units	New Jersey Higher of PQLs and Ground Water Quality Criteria (ug/l)	MW-1 202222 05/03/00 WATER	MW-2 202221 05/03/00 WATER	MW-2P 202219 05/03/00 WATER	MW-2D 202220 05/03/00 WATER	MW-3 202223 05/03/00 WATER	MW-4 202216 05/03/00 WATER	MW-4P 202229 05/03/00 WATER	MW-4D 202217 05/03/00 WATER
Diethylphthalate	5,000	NR	NR	NR	NR	NR	NR	NR	NR
4-Chlorophenyl-phenylether	NA	NR	NR	NR	NR	NR	NR	NR	NR
Fluorene	300	NR	NR	NR	NR	NR	NR	NR	NR
N-Nitrosodiphenylamine	20	NR	NR	NR	NR	NR	NR	NR	NR
4-Bromophenyl-phenylether	NA	NR	NR	NR	NR	NR	NR	NR	NR
Hexachlorobenzene	10	NR	NR	NR	NR	NR	NR	NR	NR
Phenanthrene	NA	NR	NR	NR	NR	NR	NR	NR	NR
Anthracene	2,000	NR	NR	NR	NR	NR	NR	NR	NR
Di-n-butylphthalate	900	NR	NR	NR	NR	NR	NR	NR	NR
Fluoranthene	300	NR	NR	NR	NR	NR	NR	NR	NR
Pyrene	200	NR	NR	NR	NR	NR	NR	NR	NR
Benzidine	50	NR	NR	NR	NR	NR	NR	NR	NR
Butylbenzylphthalate	100	NR	NR	NR	NR	NR	NR	NR	NR
3,3'-Dichlorobenzidine	60	NR	NR	NR	NR	NR	NR	NR	NR
Benzo(a)anthracene	NA	NR	NR	NR	NR	NR	NR	NR	NR
Chrysene	NA	NR	NR	NR	NR	NR	NR	NR	NR
bis(2-Ethylhexyl)phthalate	30	NR	NR	NR	NR	NR	NR	NR	NR
Di-n-octylphthalate	100	NR	NR	NR	NR	NR	NR	NR	NR
Benzo(b)fluoranthene	NA	NR	NR	NR	NR	NR	NR	NR	NR
Benzo(k)fluoranthene	NA	NR	NR	NR	NR	NR	NR	NR	NR
Benzo(a)pyrene	NA	NR	NR	NR	NR	NR	NR	NR	NR
Indeno(1,2,3-cd)pyrene	NA	NR	NR	NR	NR	NR	NR	NR	NR
Dibenz(a,h)anthracene	NA	NR	NR	NR	NR	NR	NR	NR	NR
Benzo(g,h,i)perylene	NA	NR	NR	NR	NR	NR	NR	NR	NR
Total Confident Conc. BNAs (s)									
Total Estimated Conc. BNA TICs (s)									

(1) Values listed reflect the combined standards for the 2,4/2,6-Dinitrotoluene mixture.

^ Value is a revision to the Class IIA ground water quality standard based upon the November 18, 1996 Safe Drinking Water Act MCL changes and a February 5, 1997 policy memo.

Qualifiers

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

NR - Not analyzed.

* During the sampling, the sample for MW-6 was labelled MW-6P and vice versa.

932250118

Table 6: Ground Water Analytical Results for May 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID Lab Sample Number Sampling Date Matrix Dilution Factor Units	New Jersey Higher of PQLs and Ground Water Quality Criteria (ug/l)	MW-4D_Dup 202218 05/03/00 WATER	MW-4D-Diss 202232 05/03/00 WATER	MW-5 202224 05/03/00 WATER	MW-6P 202225 05/03/00 WATER 5.0 ug/L	MW-6 202228 05/03/00 WATER	MW-6D 202226 05/03/00 WATER 2.0 ug/L	MW-6D_Dup 202227 05/03/00 WATER 2.0 ug/L	Trip_Blank 202230 05/02/00 WATER
Diethylphthalate	5,000	NR	NR	NR	2.0 U	NR	0.8 U	0.8 U	NR
4-Chlorophenyl-phenylether	NA	NR	NR	NR	2.6 U	NR	1.1 U	1.1 U	NR
Fluorene	300	NR	NR	NR	3.6 U	NR	1.5 U	1.5 U	NR
N-Nitrosodiphenylamine	20	NR	NR	NR	2.8 U	NR	1.1 U	1.1 U	NR
4-Bromophenyl-phenylether	NA	NR	NR	NR	6.2 U	NR	2.5 U	2.6 U	NR
Hexachlorobenzene	10	NR	NR	NR	2.8 U	NR	1.1 U	1.1 U	NR
Phenanthrene	NA	NR	NR	NR	2.4 U	NR	1.0 U	1.0 U	NR
Anthracene	2,000	NR	NR	NR	1.4 U	NR	0.5 U	0.6 U	NR
Di-n-butylphthalate	900	NR	NR	NR	2.4 U	NR	1.0 U	1.0 U	NR
Fluoranthene	300	NR	NR	NR	2.4 U	NR	1.0 U	1.0 U	NR
Pyrene	200	NR	NR	NR	2.8 U	NR	1.1 U	1.1 U	NR
Benzidine	50	NR	NR	NR	*66 U*	NR	27 U	27 U	NR
Butylbenzylphthalate	100	NR	NR	NR	3.4 U	NR	1.4 U	1.4 U	NR
3,3'-Dichlorobenzidine	60	NR	NR	NR	24 U	NR	9.6 U	9.7 U	NR
Benzo(a)anthracene	NA	NR	NR	NR	2.0 U	NR	0.8 U	0.8 U	NR
Chrysene	NA	NR	NR	NR	3.2 U	NR	1.3 U	1.3 U	NR
bis(2-Ethylhexyl)phthalate	30	NR	NR	NR	9.8 U	NR	7.5	9.9	NR
Di-n-octylphthalate	100	NR	NR	NR	1.6 U	NR	0.6 U	0.6 U	NR
Benzo(b)fluoranthene	NA	NR	NR	NR	1.8 U	NR	0.7 U	0.7 U	NR
Benzo(k)fluoranthene	NA	NR	NR	NR	3.2 U	NR	1.3 U	1.3 U	NR
Benzo(a)pyrene	NA	NR	NR	NR	1.2 U	NR	0.5 U	0.5 U	NR
Indeno(1,2,3-cd)pyrene	NA	NR	NR	NR	2.4 U	NR	1.0 U	1.0 U	NR
Dibenz(a,h)anthracene	NA	NR	NR	NR	1.4 U	NR	0.6 U	0.6 U	NR
Benzo(g,h,i)perylene	NA	NR	NR	NR	2.2 U	NR	0.9 U	0.9 U	NR
Total Confident Conc. BNAs (s)					7.4		14	16	
Total Estimated Conc. BNA TICs (s)					59670		2876	2923	

(1) Values listed reflect the combined standards for the 2,4/2,6-Dinitrotoluene mixture.
* Value is a revision to the Class IIA ground water quality standard based upon the November 18, 1996 Safe Drinking Water Act MCL changes and a February 5, 1997 policy memo.

Qualifiers
U - The compound was not detected at the indicated concentration.
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.
B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
NR - Not analyzed.

* During the sampling, the sample for MW-6 was labelled MW-6P and vice versa.

Table 6: Ground Water Analytical Results for May 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

	Sample ID Lab Sample Number Sampling Date Matrix Dilution Factor Units	New Jersey Higher of PQLs and Ground Water Quality Criteria (ug/l)	MW-1 202222 05/03/00 WATER	MW-2 202221 05/03/00 WATER	MW-2P 202219 05/03/00 WATER	MW-2D 202220 05/03/00 WATER	MW-3 202223 05/03/00 WATER	MW-4 202216 05/03/00 WATER	MW-4P 202229 05/03/00 WATER	MW-4D 202217 05/03/00 WATER
	PESTICIDES/PCBs									
	Aldrin	0.04	NR	NR	NR	NR	NR	NR	NR	NR
	alpha-BHC	0.02	NR	NR	NR	NR	NR	NR	NR	NR
	beta-BHC	0.2	NR	NR	NR	NR	NR	NR	NR	NR
	delta-BHC	NA	NR	NR	NR	NR	NR	NR	NR	NR
	gamma-BHC(Lindane)	0.2	NR	NR	NR	NR	NR	NR	NR	NR
	Chlordane	0.5	NR	NR	NR	NR	NR	NR	NR	NR
	4,4'-DDD	0.1	NR	NR	NR	NR	NR	NR	NR	NR
	4,4'-DDE	0.1	NR	NR	NR	NR	NR	NR	NR	NR
	4,4'-DDT	0.1	NR	NR	NR	NR	NR	NR	NR	NR
	Dieldrin	0.03	NR	NR	NR	NR	NR	NR	NR	NR
(2)	EndosulfanI	0.4	NR	NR	NR	NR	NR	NR	NR	NR
(2)	EndosulfanII	NA	NR	NR	NR	NR	NR	NR	NR	NR
	Endosulfansulfate	0.4	NR	NR	NR	NR	NR	NR	NR	NR
	Endrin	2	NR	NR	NR	NR	NR	NR	NR	NR
	Endrinaldehyde	NA	NR	NR	NR	NR	NR	NR	NR	NR
	Heptachlor	0.4	NR	NR	NR	NR	NR	NR	NR	NR
	Heptachlorepoxide	NA	NR	NR	NR	NR	NR	NR	NR	NR
	Toxaphene	3	NR	NR	NR	NR	NR	NR	NR	NR
(1)	Aroclor-1016	0.5	NR	NR	NR	NR	NR	NR	NR	NR
(1)	Aroclor-1221	0.5	NR	NR	NR	NR	NR	NR	NR	NR
(1)	Aroclor-1232	0.5	NR	NR	NR	NR	NR	NR	NR	NR
(1)	Aroclor-1242	0.5	NR	NR	NR	NR	NR	NR	NR	NR
(1)	Aroclor-1248	0.5	NR	NR	NR	NR	NR	NR	NR	NR
(1)	Aroclor-1254	0.5	NR	NR	NR	NR	NR	NR	NR	NR
(1)	Aroclor-1260	0.5	NR	NR	NR	NR	NR	NR	NR	NR
(1)	Aroclor-1262	NA	NR	NR	NR	NR	NR	NR	NR	NR
(1)	Aroclor-1268	NA	NR	NR	NR	NR	NR	NR	NR	NR

(1) Values listed reflect the combined standards for "Total PCBs"
(2) Soil Cleanup criteria is provided for "Endosulfan" without specification if it is for Endosulfan I or Endosulfan II.

Qualifiers
- U - The compound was not detected at the indicated concentration.
- J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.
- B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
- P - For dual column analysis, the percent difference between the quantitated concentrations on the two columns is greater than 40%
- * - For dual column analysis, the lowest quantitated concentration is being reported due to coeluting interference.
- NR - Not analyzed.

* During the sampling, the sample for MW-6 was labelled MW-6P and vice versa.

932250120

Table 6: Ground Water Analytical Results for May 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

		New Jersey Higher of PQLs and Ground Water Quality Criteria (ug/l)	MW-4D_Dup	MW-4D-Diss	MW-5	MW-6P	MW-6	MW-6D	MW-6D_Dup	Trip_Blank
	Lab Sample Number		202218	202232	202224	202225	202228	202226	202227	202230
	Sampling Date		05/03/00	05/03/00	05/03/00	05/03/00	05/03/00	05/03/00	05/03/00	05/02/00
	Matrix		WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	Dilution Factor					1.0		1.0	1.0	
	Units					ug/L		ug/L	ug/L	
	PESTICIDES/PCBs									
	Aldrin	0.04	NR	NR	NR	0.010 U	NR	0.010 U	0.010 U	NR
	alpha-BHC	0.02	NR	NR	NR	**0.2**	NR	0.020 U	0.020 U	NR
	beta-BHC	0.2	NR	NR	NR	0.010 U	NR	0.010 U	0.010 U	NR
	delta-BHC	NA	NR	NR	NR	0.010 U	NR	0.010 U	0.010 U	NR
	gamma-BHC(Lindane)	0.2	NR	NR	NR	0.020 U	NR	0.067 U	0.020 U	NR
	Chlordane	0.5	NR	NR	NR	0.20 U	NR	0.20 U	0.20 U	NR
	4,4'-DDD	0.1	NR	NR	NR	0.010 U	NR	0.010 U	0.010 U	NR
	4,4'-DDE	0.1	NR	NR	NR	0.010 U	NR	0.048 U	0.010 U	NR
	4,4'-DDT	0.1	NR	NR	NR	0.010 U	NR	0.020 U	0.020 U	NR
	Dieldrin	0.03	NR	NR	NR	0.010 U	NR	0.010 U	0.010 U	NR
(2)	EndosulfanI	0.4	NR	NR	NR	0.010 U	NR	0.023 U	0.010 U	NR
(2)	EndosulfanII	NA	NR	NR	NR	0.010 U	NR	0.010 U	0.010 U	NR
	Endosulfansulfate	0.4	NR	NR	NR	0.010 U	NR	0.021 U	0.015 U	NR
	Endrin	2	NR	NR	NR	0.010 U	NR	0.010 U	0.010 U	NR
	Endrinaldehyde	NA	NR	NR	NR	0.010 U	NR	0.010 U	0.010 U	NR
	Heptachlor	0.4	NR	NR	NR	0.010 U	NR	0.010 U	0.010 U	NR
	Heptachlorepoxide	NA	NR	NR	NR	0.010 U	NR	0.010 U	0.010 U	NR
	Toxaphene	3	NR	NR	NR	0.40 U	NR	0.40 U	0.40 U	NR
(1)	Aroclor-1016	0.5	NR	NR	NR	0.30 U	NR	0.30 U	0.30 U	NR
(1)	Aroclor-1221	0.5	NR	NR	NR	0.30 U	NR	0.30 U	0.30 U	NR
(1)	Aroclor-1232	0.5	NR	NR	NR	0.30 U	NR	0.30 U	0.30 U	NR
(1)	Aroclor-1242	0.5	NR	NR	NR	0.20 U	NR	0.20 U	0.20 U	NR
(1)	Aroclor-1248	0.5	NR	NR	NR	0.30 U	NR	0.30 U	0.30 U	NR
(1)	Aroclor-1254	0.5	NR	NR	NR	0.20 U	NR	0.20 U	0.20 U	NR
(1)	Aroclor-1260	0.5	NR	NR	NR	0.40 U	NR	0.40 U	0.40 U	NR
(1)	Aroclor-1262	NA	NR	NR	NR	0.20 U	NR	0.20 U	0.20 U	NR
(1)	Aroclor-1268	NA	NR	NR	NR	0.20 U	NR	0.20 U	0.20 U	NR

(1) Values listed reflect the combined standards for "Total PCBs"
(2) Soil Cleanup criteria is provided for "Endosulfan" without specification if it is for Endosulfan I or Endosulfan II.

Qualifiers
U - The compound was not detected at the indicated concentration.
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.
B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
P - For dual column analysis, the percent difference between the quantitated concentrations on the two columns is greater than 40%
* - For dual column analysis, the lowest quantitated concentration is being reported due to coeluting interference.
NR - Not analyzed.

932250121

* During the sampling, the sample for MW-6 was labelled MW-6P and vice versa.

Table 6: Ground Water Analytical Results for May 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID Lab Sample Number Sampling Date Matrix Dilution Factor Units	New Jersey Higher of PQLs and Ground Water Quality Criteria (ug/l)	MW-1 202222 05/03/00 WATER NA ug/l	MW-2 202221 05/03/00 WATER NA ug/l	MW-2P 202219 05/03/00 WATER NA ug/l	MW-2D 202220 05/03/00 WATER NA ug/l	MW-3 202223 05/03/00 WATER NA ug/l	MW-4 202216 05/03/00 WATER NA ug/l	MW-4P 202229 05/03/00 WATER NA ug/l	MW-4D 202217 05/03/00 WATER NA ug/l
METALS									
Antimony	20	4.5 U	4.5 U	4.5 U	4.5 U	4.5 U	4.5 U	4.5 U	13.5 U
Arsenic	8	**580**	**246**	**28.6**	3.6 U	**462**	5.7	**215**	**94.7**
Beryllium	20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**22.7**
Cadmium	4	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	**25.0**	**5.9**
Chromium	100	1.5	7.9	1.1 U	58.3	1.9	1.1 U	27.6	**507**
Copper	1,000	2.7 U	14.0	2.7 U	12.8	2.7 U	4.2	54.3	545
Lead	10	2.1 U	**27.0**	2.1 U	2.1 U	2.1 U	5.7	**213**	**274**
Mercury	2	0.39	**9.2**	**3.2**	0.50	0.88	**5.8**	**87.0**	1.9
Nickel	100	4.4	9.9	4.0	12.7	3.1	1.4 U	27.9	**799**
Selenium	50	4.5 U	4.5 U	4.5 U	9.0 U	4.5 U	4.5 U	4.5 U	13.5 U
Silver	NA	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	3.0	3.3 U
Thallium	10	4.1 U	8.2 U	8.2 U	4.1 U	4.1 U	4.1 U	4.1 U	*12.3 U*
Zinc	5,000	5.3	42.5	9.3	13.5	7.2	7.6	134	1980

Qualifiers
- U - The compound was not detected at the indicated concentration.
- B - Reported value is less than the Method Detection Limit but greater than or equal to the Instrument Detection Limit.
- N - The spiked sample recovery is not within control limits.
- NR - Not analyzed.

* During the sampling, the sample for MW-6 was labelled MW-6P and vice versa.

Table 6: Ground Water Analytical Results for May 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID	New Jersey Higher of PQLs and Ground Water Quality Criteria (ug/l)	MW-4D_Dup	MW-4D-Diss	MW-5	MW-6P	MW-6	MW-6D	MW-6D_Dup	Trip_Blank
Lab Sample Number		202218	202232	202224	202225	202228	202226	202227	202230
Sampling Date		05/03/00	05/03/00	05/03/00	05/03/00	05/03/00	05/03/00	05/03/00	05/02/00
Matrix		WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor		NA	NA	NA	NA	NA	NA	NA	
Units		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	
METALS									
Antimony	20	9.0 U	4.5 U	4.5 U	4.5 U	9.0 U	4.5 U	4.5 U	NR
Arsenic	8	**65.5**	3.6 U	325	42.0	3510	14.3	12.2	NR
Beryllium	20	13.5	0.20 U	0.20 U	0.20 U	21.1	0.20 U	0.20 U	NR
Cadmium	4	0.80 U	0.40 U	0.40 U	0.64	28.7	0.50	0.40 U	NR
Chromium	100	**329**	1.1 U	5.7	7.1	1130	10.5	9.9	NR
Copper	1,000	339	2.7 U	2.7 U	5.8	2950	10.0	12.9	NR
Lead	10	**172**	2.1 U	2.1 U	19.6	11800	21.0	21.8	NR
Mercury	2	1.0	0.10 U	0.10 U	0.10 U	0.36	0.13	0.73	NR
Nickel	100	**481**	2.4	5.3	7.4	503	25.1	24.2	NR
Selenium	50	9.0 U	4.5 U	9.0 U	4.5 U	45.0 U	4.5 U	4.5 U	NR
Silver	NA	2.2 U	1.1 U	1.1 U	1.1 U	15.4	1.1 U	1.1 U	NR
Thallium	10	8.2 U	4.1 U	4.1 U	4.1 U	8.2 U	4.1 U	4.1 U	NR
Zinc	5,000	1210	5.2 U	5.5	14.0	4030	15.8	13.6	NR

Qualifiers
- U - The compound was not detected at the indicated concentration.
- B - Reported value is less than the Method Detection Limit but greater than or equal to the Instrument Detection Limit.
- N - The spiked sample recovery is not within control limits.
- NR - Not analyzed.

932250123

* During the sampling, the sample for MW-6 was labelled MW-6P and vice versa.

Table 6: Ground Water Analytical Results for May 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID Lab Sample Number Sampling Date Matrix Dilution Factor - NA Units - See Parameter	New Jersey Higher of PQLs and Ground Water Quality Criteria (ug/l)	MW-1 202222 05/03/00 WATER	MW-2 202221 05/03/00 WATER	MW-2P 202219 05/03/00 WATER	MW-2D 202220 05/03/00 WATER	MW-3 202223 05/03/00 WATER	MW-4 202216 05/03/00 WATER	MW-4P 202229 05/03/00 WATER	MW-4D 202217 05/03/00 WATER
WET CHEMISTRY									
DOC,filterfirst - mg/l	NA	11.3	38.8	22.1	9.7	9.5	5.0	51.2	9.9
Sulfate - mg/l	250,000	5.0 U	1700	5850	168	5.0 U	36.0	NR	244
Sulfide - mg/l	NA	1.0 U	1.0 U	2.1	1.0 U	1.0 U	1.0 U	NR	1.0 U
TotalCyanide - mg/l	200	NR	NR	NR	NR	NR	NR	NR	NR
TotalOrganicCarbon - mg/l	NA	14.2	42.3	24.4	10.2	10.6	4.9	57.4	10.3
TotalPhenols - mg/l	NA	NR	NR	NR	NR	NR	NR	NR	NR

Qualifiers
U - The compound was not detected at the indicated concentration.
NR - Not analyzed.

* During the sampling, the sample for MW-6 was labelled MW-6P and vice versa.

932250124

Table 6: Ground Water Analytical Results for May 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

mple ID Lab Sample Number Sampling Date Matrix Dilution Factor - NA Units - See Parameter	New Jersey Higher of PQLs and Ground Water Quality Criteria (ug/l)	MW-4D_Dup 202218 05/03/00 WATER	MW-4D-Diss 202232 05/03/00 WATER	MW-5 202224 05/03/00 WATER	MW-6P 202225 05/03/00 WATER	MW-6 202228 05/03/00 WATER	MW-6D 202226 05/03/00 WATER	MW-6D_Dup 202227 05/03/00 WATER	Trip_Blank 202230 05/02/00 WATER
WET CHEMISTRY									
DOC,filterfirst - mg/l	NA	8.9	NR	36.1	181	NR	25.2	23.6	NR
Sulfate - mg/l	250,000	248	NR	18.8	5.2	NR	32.0	32.0	NR
Sulfide - mg/l	NA	2.1	NR	2.1	13.1	NR	1.0 U	1.0 U	NR
TotalCyanide - mg/l	200	NR	NR	NR	0.017	NR	0.016	0.013	NR
TotalOrganicCarbon - mg/l	NA	9.1	NR	38.4	181	NR	25.1	24.4	NR
TotalPhenols - mg/l	NA	NR	NR	NR	0.17	NR	0.05 U	0.05 U	NR

Qualifiers
U - The compound was not detected at the indicated concentration.
NR - Not analyzed.

* During the sampling, the sample for MW-6 was labelled MW-6P and vice versa.

932250125

Table 7: Comparison of Ground Water Concentrations of Chlorinated Volatile Organic Constituents, Arsenic, Lead, and Mercury Concentrations in Shallow, Peat, Deep Wells - May 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Constituent	MW-2	MW-2P	MW-2D	MW-4	MW-4P	MW-4D	MW-6	MW-6P	MW-6D
Total PCE, TCE	5,100	45,000	1,750	ND	4.4	3.5	ND	ND	ND
Total DCE, VC	2,970	ND	ND	ND	16.2	ND	ND	ND	ND
Arsenic	246	28.7	ND	5.7	215	94.7	42	3510	14.3
Lead	14	ND	ND	5.7	213	274	19.6	11.8	21.8
Mercury	27	3.2	0.5	5.8	87	1.9	ND	0.36	0.73

Note: MW-4P and MW-6P were highly turbid.

Table 19: Summary of Primary Organic Constituent Concentrations in Ground Water 1996 to 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID	NJ Class IIA	MW-1												MW-2											
Date Sampled	Groundwater Criterion[2]	11/19/96		5/14/97		11/26/97		11/98		7/99		5/00		11/19/96		5/14/97		11/26/97		11/98		7/99		5/00	
Compound (ug/l)																									
1,1,1-Trichloroethane	30	5	U	1	U	1	U	1.8	U	NS		0.3	U	**500**		**74.4**		**3800**		**6300**		**16000**		**3000**	
1,1-Dichloroethane	70	5	U	1	U	1	U	2.4	U	NS		5.1		5	U	41.3		**670**		**1600**		**3400**		**820**	
1,1-Dichloroethene	2	*5*	*U*	1	U	1	U	2.0	U	NS		0.4	U	*5*	*U*	**11.9**		**620**		**940**		**3100**		**690**	
1,2-cis-Dichloroethene	10	NA			U	1	U	0.92	U	NS		0.2	U	NA		**68.6**		**1300**		*46*	*U*	*43*	*U*	*6.0*	*U*
1,2-Dichloroethane	2	*5*	*U*	1	U	1	U	NA		NS		0.4	U	*5*	*U*	**29**		**1300**		NA		*110*	*U*	**24**	
Benzene	1	**81**		**96**		**68**		**56**		NS		**51**		**4300**		**3240**	D	**8800**	D	**3700**		**5900**		**3200**	
Chlorobenzene	50	5	U	1	U	1	U	2.6		NS		2.8		5	U	21.2		1	U	*60*	*U*	*64*	*U*	5.8	U
Chloroethane	-	10	U	1	U	1	U	1.5	U	NS		0.4	U	1200		133		970		280		250	U	820	
Ethylbenzene	700	5	U	1	U	1	U	1.5	U	NS		0.3	U	5	U	81.3		1	U	90		74	U	13	
Methylene Chloride	2	*5*	*U*	2	U	*3*	*U*	1.4	U	NS		0.8	U	**190**	J	2	U	**170**		*70*	*U*	*150*	*U*	*21*	*U*
Styrene	100	5	U	1	U	1	U	NA		NS		NA		5	U	6.6		1	U	NA		33	U	NA	
Tetrachloroethene	1	*5*	*U*	1	U	1	U	*2.3*	*U*	NS		**38**		*5*	*U*	**80.8**		**3100**		**370**		**9500**		**2500**	
Toluene	1000	0.7	J	1	U	1	U	2.0	U	NS		0.3		5	U	45.7		1	U	100	U	45	U	23	
Trichloroethene	1	*5*	*U*	1	U	1	U	*2.4*	*U*	NS		**29**		**140**	J	**74.7**		**4000**		**2300**		**14000**		**2600**	
Vinyl Chloride	5	**7**	J	1	U	2	U	1.6	U	NS		0.7	U	*10*	*U*	1	U	2	U	**500**		*110*	*U*	**250**	
Xylenes (total)	40	5	U	1	U	1	U	NA		NS		0.3	U	5	U	**171**		1	U	NA		*110*	*U*	9.4	

Notes:
U: Not detected at listed detection limit.
NA: Not analyzed.
J: Estimated concentration, detection below quantitation limit.
Italics: detection limit exceeds GWQS
Bold: Concentrations exceeds GWQS

Table 19: Summary of Primary Organic Constituent Concentrations in Ground Water 1996 to 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID	NJ Class IIA	MW-3											
Date Sampled	Groundwater Criterion[2]	11/19/96		5/14/97		11/26/97		11/98		7/99		5/00	
Compound (ug/l)													
1,1,1-Trichloroethane	30	5	U	1	U	1	U	1.8	U	10		0.3	U
1,1-Dichloroethane	70	5	U	1	U	1	U	2.4	U	0.29	U	3.2	
1,1-Dichloroethene	2	*5*	*U*	1	U	1	U	2.0	U	1.1	U	0.4	U
1,2-cis-Dichloroethene	10	NA			U	1	U	0.92	U	0.31	U	0.2	U
1,2-Dichloroethane	2	*5*	*U*	1	U	1	U	NA		0.79	U	0.4	U
Benzene	1	5	U	1	U	1	U	*1.4*	*U*	**5.5**		0.5	
Chlorobenzene	50	5	U	1	U	1	U	1.2	U	0.25	U	0.2	U
Chloroethane	-	10	U	1	U	1	U	1.5	U	0.49	U	0.4	U
Ethylbenzene	700	5	U	1	U	1	U	1.5	U	0.15	U	0.3	U
Methylene Chloride	2	*5*	*U*	2	U	*3*	*U*	1.4	U	0.82	U	0.8	U
Styrene	100	5	U	1	U	1	U	NA		0.24	U	NA	
Tetrachloroethene	1	*5*	*U*	1	U	1	U	*2.3*	*U*	**7.5**		**38**	
Toluene	1000	5	U	1	U	1	U	2.0	U	5.7		0.3	U
Trichloroethene	1	*5*	*U*	1	U	1	U	*2.4*	*U*	**12**		**24**	
Vinyl Chloride	5	*10*	*U*	1	U	2	U	1.6	U	0.52	U	0.7	U
Xylenes (total)	40	5	U	1	U	1	U	NA		0.57	U	0.3	U

Sample ID	MW-4											
Date Sampled	11/19/96		5/14/97		11/26/97		11/98		7/99		5/00	
Compound (ug/l)												
1,1,1-Trichloroethane	5	U	1	U	1	U	NS		0.38	U	0.7	U
1,1-Dichloroethane	5	U	1	U	1	U	NS		0.29	U	0.7	U
1,1-Dichloroethene	*5*	*U*	1	U	1	U	NS		1.1	U	0.8	U
1,2-cis-Dichloroethene	NA			U	1	U	NS		0.31	U	0.5	U
1,2-Dichloroethane	*5*	*U*	**16**		1	U	NS		0.79	U	0.9	U
Benzene	**980**		**964**	D	**390**	D	NS		**94**		**310**	
Chlorobenzene	5	U	1	U	1	U	NS		0.25	U	0.5	U
Chloroethane	10	U	1	U	1	U	NS		0.49	U	0.9	U
Ethylbenzene	5	U	8.13		1	U	NS		0.15	U	1.9	
Methylene Chloride	*5*	*U*	2	U	*3*	*U*	NS		0.82	U	1.7	U
Styrene	5	U	NA		1	U	NS		0.24	U	NA	
Tetrachloroethene	*5*	*U*	1	U	1	U	NS		0.47	U	0.6	U
Toluene	5	U	1	U	1	U	NS		1		0.6	U
Trichloroethene	*5*	*U*	1	U	1	U	NS		**1.2**		0.8	U
Vinyl Chloride	*10*	*U*	1	U	2	U	NS		0.52	U	1.3	U
Xylenes (total)	5	U	1	U	1	U	NS		0.57	U	0.6	U

Notes:
U: Not detected at listed detection limit.
NA: Not analyzed.
J: Estimated concentration, detection below quantitation limit.
Italics: detection limit exceeds GWQS
Bold: Concentrations exceeds GWQS

Table 19: Summary of Primary Organic Constituent Concentrations in Ground Water 1996 to 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID	NJ Class IIA	MW-5												MW-6	
Date Sampled	Groundwater Criterion[2]	11/19/96		5/14/97		11/26/97		11/98		7/99		5/00		5/00	
Compound (ug/l)															
1,1,1-Trichloroethane	30	5	U	1	U	1	U	18	U	51	U	1.6	U	6.6	U
1,1-Dichloroethane	70	5	U	1	U	1	U	24	U	52	U	1.8	U	7.4	U
1,1-Dichloroethene	2	*5*	*U*	1	U	1	U	*20*	*U*	*68*	*U*	2.0	U	*8.2*	*U*
1,2-cis-Dichloroethene	10	NA			U	1	U	9.2	U	*43*	*U*	1.2	U	4.8	U
1,2-Dichloroethane	2	*5*	*U*	1	U	1	U	NA		*110*	*U*	*2.2*	*U*	*8.8*	*U*
Benzene	1	**54**		**40.9**		**54**		**81**		**210**		*1.3*	*U*	**32**	
Chlorobenzene	50	5	U	1	U	1	U	12	U	*64*	*U*	1.2	U	36	
Chloroethane	-	10	U	1	U	1	U	15	U	250	U	2.2	U	8.8	U
Ethylbenzene	700	5	U	1	U	2.8		15	U	74	U	1.3	U	18	
Methylene Chloride	2	*5*	*U*	2	U	*3*	*U*	*14*	*U*	*150*	*U*	*4.2*	*U*	*17*	*U*
Styrene	100	5	U	1	U	1	U	NA		33	U	NA		NA	
Tetrachloroethene	1	*5*	*U*	1	U	1	U	*23*	*U*	*100*	*U*	*1.6*	*U*	*6.4*	*U*
Toluene	1000	5	U	1.09		1.7		20	U	45	U	1.5	U	17	
Trichloroethene	1	*5*	*U*	1	U	1	U	*24*	*U*	*79*	*U*	*2.0*	*U*	*8.2*	*U*
Vinyl Chloride	5	*10*	*U*	1	U	2	U	*16*	*U*	*110*	*U*	3.2	*U*	*13*	*U*
Xylenes (total)	40	5	U	3.8		**313**		NA		*110*	*U*	1.6	U	**170**	

Notes:
U: Not detected at listed detection limit.
NA: Not analyzed.
J: Estimated concentration, detection below quantitation limit.
Italics: detection limit exceeds GWQS
Bold: Concentrations exceeds GWQS

Table 20: Summary of Primary Inorganic Constituent Concentrations in Ground Water 1996 to 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID	NJ Class IIA	MW-1														
Date Sampled	Ground Water	Total				Dissolved				Low Flow						
	Criterion	11/19/96		5/14/97		11/19/96		5/14/97		11/26/97		11/24/98		7/1/99	5/3/00	
Inorganic Elements (ug/l)																
Antimony	20	*60*	*U*	8	U	*60*	*U*	8	U	5	U	*60*	*U*	NS	4.5	U
Arsenic	8	**1320**	**J**	**840**		**887**	**J**	**690**		**819**		**890**		NS	580	
Barium	2000	484		467		342		330		500	U	296		NS		
Beryllium	20	5	U	4	U	5	U	4	U	1	U	5	U	NS	0.20	U
Cadmium	4	*5*	*U*	1.3		*5*	*U*	0.6	U	4	U	5	U	NS	0.40	U
Chromium	100	**150**	**J**	57		10	U	20	U	5.3		10	U	NS	1.5	
Cobalt	NA	50	U	40	U	50	U	40	U	250	U	50	U	NS		
Copper	1000	25	U	40	U	25	U	40	U	5	U	20	U	NS	2.7	U
Iron	300	**32300**		**36900**		**18500**		**20300**		**13600**		**17000**		NS		
Lead	10	**216**	**J**	**27.2**		3	U	4	U	5	U	8.51		NS	2.1	U
Magnesium	NA	28800		30300		28600		28000		21300		25300		NS		
Manganese	50	**2030**		**2440**		**1580**		**1630**		**1340**		**1580**		NS		
Mercury	2	**1300**	**J**	**3.5**		1	J	0.5	U	1.82		**5.59**		NS	0.39	
Nickel	100	40	U	60	U	40	U	60	U	10	U	40	U	NS	4.4	
Selenium	50	5	U	8	U	5	U	8	U	8	U	5	U	NS		
Silver	NA	10	U	0.4	U	10	U	0.4	U	1	U	10	U	NS	1.1	U
Thallium	10	10	U	8	U	10.3		8	U	5	U	14.6		NS	4.1	U
Vanadium	NA	50	U	34		50	U	30	U	25	U	50	U	NS		
Zinc	5000	441	J	270		20	U	29		91		12.7		NS	5.3	

Notes:
U: Not detected at listed detection limit.
J: Estimated concentration, detection below quantitation limit.
Italics: detection limit exceeds GWQS
Bold: Concentrations exceeds GWQS

Table 20: Summary of Primary Inorganic Constituent Concentrations in Ground Water 1996 to 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID	**NJ Class IIA**	**MW - 2**															
Date Sampled	**Ground Water**	**Total**				**Dissolved**				**Low Flow**							
	Criterion	**11/19/96**		**5/14/97**		**11/19/96**		**5/14/97**		**11/26/97**		**11/23/98**		**7/1/99**		**5/3/00**	
Inorganic Elements (ug/l)																	
Antimony	20	*60*	*U*	8	U	*60*	*U*	8	U	5	U	*60*	*U*	1.5	U	4.5	U
Arsenic	8	**258**	**J**	**197**		**317**	**J**	**82**		**355**		**477**		**330**		**246**	
Barium	2000	200	U	149		200	U	86		500	U	32.5		26			
Beryllium	20	5	U	4	U	5	U	4	U	1	U	5	U	0.86	U	0.20	U
Cadmium	4	*5*	*U*	**4.6**		*5*	*U*	0.6	U	4	U	*5*	*U*	1.2	U	0.40	U
Chromium	100	10	U	20	U	10	U	20	U	5.9		10	U	63		7.9	
Cobalt	NA	50	U	40	U	50	U	40	U	250	U	50	U				
Copper	1000	25	U	40	U	25	U	50		5	U	20	U	12		14.0	
Iron	300	**5590**		**7210**		**3690**		**447**		**9630**		**9340**					
Lead	10	9.5	J	**21**		3	U	4	U	5	U	7.49		**19**		**27.0**	
Magnesium	NA	40500		24700		39200		20600		48600		126000					
Manganese	50	**2090**		**1630**		**1920**		**1060**		**3800**		**11200**					
Mercury	2	0.2	U	0.5	U	0.2	U	0.5	U	1	U	0.3	U	0.97		**9.2**	
Nickel	100	40	U	60	U	40	U	60	U	10	U	40	U	21		9.9	
Selenium	50	5	U	8	U	5	U	8	U	8	U	10	U	3.7	U		
Silver	NA	10	U	0.4	U	10	U	0.4	U	1	U	10	U	0.78	U	1.1	U
Thallium	10	**11.3**		8	U	10	U	8	U	5	U	**15.6**		3.6	U	8.2	U
Vanadium	NA	50	U	30	U	50	U	30	U	25	U	50	U				
Zinc	5000	50.9	J	114		20	U	28		84		10	U	40		42.5	

Notes:
U: Not detected at listed detection limit.
J: Estimated concentration, detection below quantitation limit.
Italics: detection limit exceeds GWQS
Bold: Concentrations exceeds GWQS

932250131

Table 20: Summary of Primary Inorganic Constituent Concentrations in Ground Water 1996 to 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID	NJ Class IIA	MW - 3															
Date Sampled	Ground Water	Total				Dissolved				Low Flow							
	Criterion	11/19/96		5/14/97		11/19/96		5/14/97		11/26/97		11/24/98		7/1/99		5/3/00	
Inorganic Elements (ug/l)																	
Antimony	20	*60*	*U*	8	U	*60*	*U*	8	U	5	U	*60*	*U*	1.5	U	4.5	U
Arsenic	8	**343**	**J**	**540**		**401**	**J**	**670**		**350**		**445**		**400**		**462**	
Barium	2000	200	U	211		200	U	124		500	U	133		100			
Beryllium	20	5	U	4	U	5	U	4	U	1	U	5	U	0.86	U	0.20	U
Cadmium	4	*5*	*U*	0.6	U	*5*	*U*	0.6	U	4	U	*5*	*U*	1.2	U	0.40	U
Chromium	100	66.1	J	73		10	U	20	U	4.6		10	U	34			
Cobalt	NA	50	U	40	U	50	U	40	U	*250*	U	*50*	*U*			1.9	
Copper	1000	25	U	40	U	25	U	40	U	5	U	88.4		8.2			
Iron	300	**18800**		**22500**		**10400**		**10200**		**10100**		**12200**				2.7	U
Lead	10	**155**	**J**	**17.3**		3	U	4	U	5	U	6.24		**25**			
Magnesium	NA	8960		9030		8340		8390		7330		9170				2.1	U
Manganese	50	**733**		**788**		**614**		**630**		**445**		**723**					
Mercury	2	**2040**	**J**	**8.4**		1.1	J	1	U	**11.8**		**24.2**		**100**		0.88	
Nickel	100	40	U	60	U	40	U	60	U	10	U	40	U	12	U	3.1	
Selenium	50	5	U	8	U	5	U	8	U	8	U	5	U	3.7	U		
Silver	NA	10	U	0.4	U	10	U	0.4	U	1	U	10	U	0.78	U	1.1	U
Thallium	10	10	U	8	U	10.4		8	U	5	U	10	U	3.6	U	4.1	U
Vanadium	NA	50	U	30	U	50	U	30	U	25	U	50	U				
Zinc	5000	239	J	205		31.4	J	48		51		10	U	38	U	7.2	

Notes:
U: Not detected at listed detection limit.
J: Estimated concentration, detection below quantitation limit.
Italics: detection limit exceeds GWQS
Bold: Concentrations exceeds GWQS

Table 20: Summary of Primary Inorganic Constituent Concentrations in Ground Water 1996 to 2000
Troy Chemical Corporation, Inc.
Newark, New Jersey

Sample ID	NJ Class IIA	MW - 4															
Date Sampled	Ground Water	Total				Dissolved				Low Flow							
	Criterion	11/19/96		5/14/97		11/19/96		5/14/97		11/26/97		11/24/98		7/1/99		5/3/00	
Inorganic Elements (ug/l)																	
Antimony	20	*60*	*U*	8	U	*60*	*U*	8	U	5	U	NS		1.5	U	4.5	U
Arsenic	8	10	U	**11**		**25.8**	**J**	6		**19.7**		NS		**10**		5.7	
Barium	2000	355		213		210		104		500	U	NS		110			
Beryllium	20	5	U	4	U	5	U	4	U	1	U	NS		0.86	U	0.20	U
Cadmium	4	*5*	*U*	0.7		*5*	*U*	0.6	U	4	U	NS		1.2	U	0.40	U
Chromium	100	33.2	J	27		10	U	20	U	4		NS		84		1.1	U
Cobalt	NA	50	U	40	U	50	U	40	U	250	U	NS					
Copper	1000	25	U	40	U	25	U	40	U	19		NS		7.3		4.2	
Iron	300	**18900**		**14500**		**3050**		**2120**		**6180**		NS					
Lead	10	**577**	**J**	**105**		3	U	4	U	**42.6**		NS		**39**		5.7	
Magnesium	NA	17300		11300		15000		10100		12900		NS					
Manganese	50	**1060**		**631**		**759**		**458**		**549**		NS					
Mercury	2	**2460**	**J**	0.5	U	0.5	U	0.5	U	1	U	NS		1		**5.8**	
Nickel	100	40	U	60	U	40	U	60	U	10	U	NS		12	U	1.4	U
Selenium	50			8	U	5	U	8	U	8	U	NS		3.7	U		
Silver	NA			0.4	U	10	U	0.4	U	1	U	NS		0.78	U	1.1	U
Thallium	10	**11.5**				10	U	8	U	5	U	NS		3.6	U	4.1	U
Vanadium	NA	104		71		50	U	30	U	25	U	NS					
Zinc	5000	503	J	305		20	U	43		93		NS		38	U	7.6	

Notes:
U: Not detected at listed detection limit.
J: Estimated concentration, detection below quantitation limit.
Italics: detection limit exceeds GWQS
Bold: Concentrations exceeds GWQS

Table 20: Summary of Primary Inorganic Constituent Concentrations in Ground Water 1996 to 2000

Troy Chemical Corporation, Inc.

Newark, New Jersey

Sample ID	NJ Class IIA	MW - 5														MW-6	
Date Sampled	Ground Water	Total				Dissolved				Low Flow							
	Criterion	11/19/96		5/14/97		11/19/96		5/14/97		11/26/97		11/23/98		7/1/99		5/3/00	
Inorganic Elements (ug/l)																	
Antimony	20	*60*	*U*	9.59		*60*	*U*	8	U	5	U	*60*	*U*	1.5	U	4.5	U
Arsenic	8	**74.3**	**J**	**36**		**74.7**	**J**	7.2		**102**		**244**		**510**		**325**	
Barium	2000	1110		881		876		1070		500	U	373		240			
Beryllium	20	5	U	4	U	5	U	4	U	1	U	5	U	0.86	U	0.20	U
Cadmium	4	*5*	*U*	0.7		*5*	*U*	0.6	U	4	U	*5*	*U*	1.2	U	0.40	U
Chromium	100	60.7	J	20	U	10	U	20	U	14.3		16.8		**460**		5.7	
Cobalt	NA	50	U	40	U	50	U	40	U	250	U	50	U				
Copper	1000	25	U	99		25	U	48		5	U	20	U	9.3		2.7	U
Iron	300	**26600**		**7360**		**14000**		**1780**		**8520**		**3920**					
Lead	10	**97.8**	**J**	**14.4**		3	U	4	U	5	U	7.54		3.1	U	2.1	U
Magnesium	NA	20200		18500		20400		15500		12400		21800					
Manganese	50	**853**		**775**		**744**		**708**		**466**		**407**					
Mercury	2	**28.4**	**J**	0.5	U	0.2	U	0.5	U	1	U	0.3	U	0.18	U	0.10	U
Nickel	100	40	U	60	U	40	U	60	U	10	U	40	U	12	U	5.3	
Selenium	50	5	U	8.96		5	U	8	U	8	U	10	U	3.7	U	9.0	U
Silver	NA	10	U	1.2		10	U	0.4	U	1	U	10	U	0.78	U	1.1	U
Thallium	10	**12**		8	U	10	U			9.5		**19.8**		3.6	U	4.1	U
Vanadium	NA	63.6		88		50	U	125		118		74.6					
Zinc	5000	398	J	454		24.9	J	246		40		32.2		38	U	5.5	

Notes:
U: Not detected at listed detection limit.
J: Estimated concentration, detection below quantitation limit.
Italics: detection limit exceeds GWQS
Bold: Concentrations exceeds GWQS

G5

```
                    FACILITY REPORT (BRS DATA)
          search used- Facility        : TROY CHEMICAL*
                       City            : NEWARK
                       State           : NJ
                       EPA ID          : ALL
                       Year            : ALL
                       Level of Detail: HIGH
          Results:
```

This search was taken from RTK NET's (the Right-To-Know Network)'s copy of EPA's BRS database. RTK NET is run by OMB Watch at 1742 Connecticut Ave. NW, Washington DC 20009 Phone: 202-234-8494
The search was done on 09/26/2002.
This copy of the database was last updated on 05/29/2002.

Note: "Federal" waste is waste with at least one Federal EPA waste code. Non-Federal waste is regulated by the state only. "RCRA" waste is Federal waste that is managed (treated, disposed, or recycled) in a RCRA-permitted TSD unit. The waste is classified according to assumptions made about where it ends up.

If you don't see the words *END OF REPORT* at the end of this search, then this Web search didn't complete -- back up and try it again.

Reporting Year: 1989

```
----------------------------------------------------------------------------
Facility Name: TROY CHEMICAL CORP.   Reporting Year: 1989
Street       : 1 AVENUE L
City         : NEWARK                      State: NJ   Zip: 07105
County       : ESSEX   EPA ID: NJD002144517
Mailing Address: 1 AVENUE L
Mailing City   : NEWARK                      State: NJ   Zip: 07105
Year: 1989           Total Waste   Federal Wst.  RCRA Waste
Tons Generated  :        140.20        140.20        140.20
Tons Shipped    :        140.20        140.20        140.20
SIC Code(s):
Contact: EDWARD CAPASSO   Phone: 2015892500-240
Generator Status : Large Quantity Generator (LQG)
Storage Status   : No RCRA-permitted or interim status storage
RCRA TDR Status  : No on-site TDR; site has no plans to develop system
Exempt TDR Status: No on-site TDR; site has no plans to develop system
----------------------------------------------------------------------------
```

List of wastes generated by this facility:

Waste Desc.:
EPA Waste Code(s) for this generated waste-
  D001 Ignitable waste
Tons Generated: 0.69
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
CHEMICAL WASTE MANAGEMENT INC
EMELLE, AL
System type: M999
Tons sent: 0.69   EPA ID: ALD000622464

BBF000028

Waste Desc.:
EPA Waste Code(s) for this generated waste-

D002 Corrosive waste
Tons Generated: 0.23
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
CHEMICAL WASTE MANAGEMENT INC
EMELLE, AL
System type: M999
Tons sent: 0.23 EPA ID: ALD000622464

Waste Desc.:
EPA Waste Code(s) for this generated waste-
D009 Mercury
Tons Generated: 111.92
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
CHEMICAL WASTE MANAGEMENT INC
EMELLE, AL
System type: M999
Tons sent: 111.92 EPA ID: ALD000622464

Waste Desc.:
EPA Waste Code(s) for this generated waste-
D001 Ignitable waste
Tons Generated: 1.50
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ROLLINS ENVIRONMENTAL SERVIC
BRIDGEPORT, NJ
System type: M999
Tons sent: 1.50 EPA ID: NJD053288239

Waste Desc.:
EPA Waste Code(s) for this generated waste-
D001 Ignitable waste
Tons Generated: 8.60
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 8.60 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
D002 Corrosive waste
Tons Generated: 0.13
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.13 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-

D003 Reactive waste
Tons Generated: 0.02
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.02 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
D005 Barium
Tons Generated: 0.03
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.03 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
D006 Cadmium
Tons Generated: 0.06
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.06 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
D007 Chromium
Tons Generated: 0.01
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.01 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
D008 Lead
Tons Generated: 0.07
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.07 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-

F005 Spent non-halogenated solvents (see 1991 Form)
Tons Generated: 0.02
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.02 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
P014 Benzenethiol or Thiophenol
Tons Generated: 0.01
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.01 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
P028 Benzene, (chloromethyl)- or Benzyl chloride
Tons Generated: 0.01
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.01 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
P029 Copper cyanide Cu(CN)
Tons Generated: 0.01
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.01 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
P030 Cyanides (soluble cyanide salts), not otherwise specified
Tons Generated: 0.03
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.03 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-

U019 Benzene (I,T)
Tons Generated: 0.50
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.50 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
U039 p-Chloro-m-cresol or Phenol, 4--chloro-3-methyl-
Tons Generated: 0.01
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.01 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
U048 o-Chlorophenol or Phenol, 2-chloro-
Tons Generated: 0.03
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.03 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
U052 Cresol (Cresylic acid) or Phenol, methyl-
Tons Generated: 0.01
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.01 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
U101 2,4-Dimethylphenol or Phenol, 2,4-dimethyl-
Tons Generated: 0.01
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.01 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-

U129 Lindane
Tons Generated: 0.01
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.01 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
U144 Acetic acid, lead(2+) salt or Lead acetate
Tons Generated: 0.01
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.01 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
U201 1,3-Benzenediol or Resorcinol
Tons Generated: 0.03
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.03 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
U247 Methoxychlor
Tons Generated: 0.01
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.01 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-
U328 Benzenamine, 2-methyl or o-Toluidine
Tons Generated: 0.01
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADV ENVIRON TECH CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.01 EPA ID: NJD080631369

Waste Desc.:
EPA Waste Code(s) for this generated waste-

D001 Ignitable waste
Tons Generated: 3.53
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
CHEMICAL WASTE MGT OF NJ
NEWARK, NJ
System type: M999
Tons sent: 3.53 EPA ID: NJD089216790

Waste Desc.:
EPA Waste Code(s) for this generated waste-
D009 Mercury
Tons Generated: 3.96
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
CHEMICAL WASTE MGT OF NJ
NEWARK, NJ
System type: M999
Tons sent: 3.96 EPA ID: NJD089216790

Waste Desc.:
EPA Waste Code(s) for this generated waste-
P048 2,4-Dinitrophenol or Phenol, 2,4-dinitro-
Tons Generated: 0.09
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
CHEMICAL WASTE MGT OF NJ
NEWARK, NJ
System type: M999
Tons sent: 0.09 EPA ID: NJD089216790

Waste Desc.:
EPA Waste Code(s) for this generated waste-
D001 Ignitable waste
Tons Generated: 8.60
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADVANCED ENV TECHNOLOGY CORP
FLANDERS, NJ
System type: M999
Tons sent: 8.60 EPA ID: NJD980536593

Waste Desc.:
EPA Waste Code(s) for this generated waste-
D002 Corrosive waste
Tons Generated: 0.03
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADVANCED ENV TECHNOLOGY CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.03 EPA ID: NJD980536593

Waste Desc.:
EPA Waste Code(s) for this generated waste-

F003 Spent non-halogenated solvents (see 1991 Form)
Tons Generated: 0.02
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADVANCED ENV TECHNOLOGY CORP
FLANDERS, NJ
System type: M999
Tons sent: 0.02 EPA ID: NJD980536593

Reporting Year: 1993

Facility Name: TROY CHEMICAL CORP Reporting Year: 1993
Street : ONE AVE L
City : NEWARK State: NJ Zip: 071050000
County : ESSEX EPA ID: NJD002144517
Mailing Address: ONE AVE L
Mailing City : NEWARK State: NJ Zip: 071050000

Year: 1993	Total Waste	Federal Wst.	RCRA Waste
Tons Generated :	46.01	43.92	43.92
Tons Shipped :	46.01	43.93	43.92

SIC Code(s):
Contact: EDWARD J CAPASSO Phone: 2015892500-340
Generator Status : Large Quantity Generator (LQG)
Storage Status : No RCRA-permitted or interim status storage
RCRA TDR Status : No on-site TDR; site has no plans to develop system
Exempt TDR Status: No on-site TDR; site has no plans to develop system

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List of wastes generated by this facility:

Waste Desc.: PAINT WITH SOLVENTS IGNITABLE
EPA Waste Code(s) for this generated waste-
D001 Ignitable waste
F003 Spent non-halogenated solvents (see 1991 Form)
D035 Methyl ethyl ketone
Tons Generated: 0.64
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ASHLAND CHEMICAL CO
BINGHAMTON, NY
System type: M141
Tons sent: 0.44 EPA ID: NYD049253719

ADVANCED ENVIRONMENTAL TECHNOLOGY CORP.
FLANDERS, NJ
System type: M141
Tons sent: 0.20 EPA ID: NJD980536593

Waste Desc.: EFFLUENT SLUDGE FROM WASTEWATER TREATMENT
EPA Waste Code(s) for this generated waste-
D008 Lead
D009 Mercury
Tons Generated: 15.99
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ASHLAND CHEMICAL CO
BINGHAMTON, NY

System type: M141
Tons sent: 13.59   EPA ID: NYD049253719

ADVANCED ENVIRONMENTAL TECHNOLOGY CORP.
FLANDERS, NJ
System type: M141
Tons sent: 2.40   EPA ID: NJD980536593

Waste Desc.: DIESEL FUEL PLUS VERMICULITE
This is state-only waste (no Federal waste codes).
State waste code(s): X725
Tons Generated: 0.20
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADVANCED ENVIRONMENTAL TECHNOLOGY CORP.
FLANDERS, NJ
System type: M141
Tons sent: 0.20   EPA ID: NJD980536593

Waste Desc.: SURFACTANT WITH SOLVENT DISCARDED PRODUCT
EPA Waste Code(s) for this generated waste-
D001 Ignitable waste
Tons Generated: 3.96
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ASHLAND CHEMICAL CO
BINGHAMTON, NY
System type: M141
Tons sent: 3.96   EPA ID: NYD049253719

Waste Desc.: OIL AND SOLVENT MIX FROM PROCESS
EPA Waste Code(s) for this generated waste-
D001 Ignitable waste
Tons Generated: 23.20
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
NORLITE CORPORATION
COHOES, NY
System type: M061
Tons sent: 23.20   EPA ID: NYD080469935

Waste Desc.: LABORATORY DISCARDED CHEMICALS LAB PACKS
EPA Waste Code(s) for this generated waste-
P098 Potassium cyanide K(CN)
P092 Mercury, (acetato-0)phenyl- or Phenylmercury acetate
D009 Mercury
Tons Generated: 0.13
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADVANCED ENVIRONMENTAL TECHNOLOGY CORP.
FLANDERS, NJ
System type: M141
Tons sent: 0.01   EPA ID: NJD980536593

CLEAN HARBORS OF NATICK, INC.
NATICK, MA

System type: M141
Tons sent: 0.13   EPA ID: MAD980523203

Waste Desc.: LABORATORY DISCARDED CHEMICALS   LAB PACKS
This is state-only waste (no Federal waste codes).
State waste code(s): LABP
Tons Generated: 0.23
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
CLEAN HARBORS OF NATICK, INC.
NATICK, MA
System type: M141
Tons sent: 0.23   EPA ID: MAD980523203

Waste Desc.: LABORATORY DISCARDED CHEMICALS   LAB PACKS
This is state-only waste (no Federal waste codes).
State waste code(s): LABP
Tons Generated: 1.38
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADVANCED ENVIRONMENTAL TECHNOLOGY CORP.
FLANDERS, NJ
System type: M141
Tons sent: 0.20   EPA ID: NJD980536593

ASHLAND CHEMICAL CO
BINGHAMTON, NY
System type: M141
Tons sent: 1.18   EPA ID: NYD049253719

Waste Desc.: LABORATORY DISCARDED CHEMICALS   LAB PACKS
This is state-only waste (no Federal waste codes).
State waste code(s): LABP
Tons Generated: 0.18
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADVANCED ENVIRONMENTAL TECHNOLOGY CORP.
FLANDERS, NJ
System type: M141
Tons sent: 0.16   EPA ID: NJD980536593

CLEAN HARBORS OF NATICK, INC.
NATICK, MA
System type: M141
Tons sent: 0.01   EPA ID: MAD980523203

Waste Desc.: LABORATORY CHEMICALS NON HAZARDOUS
This is state-only waste (no Federal waste codes).
State waste code(s): LABP
Tons Generated: 0.04
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADVANCED ENVIRONMENTAL TECHNOLOGY CORP.
FLANDERS, NJ
System type: M141
Tons sent: 0.04   EPA ID: NJD980536593

Waste Desc.: PLANT CLEANUP SCRAPS NON HAZARDOUS
This is state-only waste (no Federal waste codes).
State waste code(s): X850
Tons Generated: 0.06
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ADVANCED ENVIRONMENTAL TECHNOLOGY CORP.
FLANDERS, NJ
System type: M141
Tons sent: 0.06 EPA ID: NJD980536593

Reporting Year: 1997

Facility Name: TROY CHEMICAL CORP INC Reporting Year: 1997
Street : 1 AVE L
City : NEWARK State: NJ Zip: 071050000
County : ESSEX EPA ID: NJD002144517
Mailing Address: 1 AVE L
Mailing City : NEWARK State: NJ Zip: 071050000

Year: 1997	Total Waste	Federal Wst.	RCRA Waste
Tons Generated :	12.16	12.16	12.16
Tons Shipped :	12.16	12.16	0.00

SIC Code(s):
Contact: EDWARD J CAPASSO Phone: 9735892500-3340
Generator Status : Large Quantity Generator (LQG)
Storage Status : No RCRA-permitted or interim status storage
RCRA TDR Status : No on-site TDR; site has no plans to develop system
Exempt TDR Status:

List of wastes generated by this facility:

Waste Desc.: LABORATORY PACKSN LAB CLEAN-OUT
EPA Waste Code(s) for this generated waste-
D001 Ignitable waste
D002 Corrosive waste
D003 Reactive waste
U119 Ethyl methanesulfonate or Methanesulfonic acid, ethyl ester
D005 Barium
D006 Cadmium
D008 Lead
D004 Arsenic
U034 Acetaldehyde, trichloro- or Chloral
U112 Acetic acid ethyl ester (I) or Ethyl acetate (1)
U008 2-Propenoic acid (I) or Acrylic acid (I)
D009 Mercury
U003 Acetonitrile (I,T)
U196 Pyridine
D039 Tetrachloroethylene
U153 Methanethiol (I,T) or Thiomethanol (I,T)
U092 Dimethylamine (1) or Methanamine, N-methyl- (1)
F005 Spent non-halogenated solvents (see 1991 Form)
U162 Methyl methacrylate (I,T)
F006 Wastewater treatment sludges from electroplating, with exceptions
U103 Dimethyl sulfate or Sulfuric acid, dimethyl ester
F003 Spent non-halogenated solvents (see 1991 Form)

U044 Chloroform or Methane, trichloro-
U123 Formic acid (C,T)
U202 Saccharin, & salts
Tons Generated: 2.36
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ASHLAND CHEMICAL
BINGHAMTON, NY
System type: Transfer Facility Storage
Tons sent: 0.49 EPA ID: NYD049253719

MATHEW MARITECO REPAIRS INC
BROOKLYN, NY
System type: Transfer Facility Storage
Tons sent: 0.26 EPA ID: NYD980536593

CLEAN HARBORS SVCS INC
CHICAGO, IL
System type: Transfer Facility Storage
Tons sent: 0.96 EPA ID: ILD000608471

CLEAN HARBORS OF BALTIMORE INC
BALTIMORE, MD
System type: Transfer Facility Storage
Tons sent: 0.01 EPA ID: MDD980555189

POLLUTION CONTROL INDUSTRIES, INC
EAST CHICAGO, IN
System type: Transfer Facility Storage
Tons sent: 0.64 EPA ID: IND000646943

Waste Desc.: LABORATORY WASTE WITH SOLVENTS FROM R&D LAB.
EPA Waste Code(s) for this generated waste-
D001 Ignitable waste
F003 Spent non-halogenated solvents (see 1991 Form)
Tons Generated: 3.05
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ASHLAND CHEMICAL
BINGHAMTON, NY
System type: Transfer Facility Storage
Tons sent: 3.05 EPA ID: NYD049253719

Waste Desc.: SPENT ACTIVATED CARBON FROM PROCESS
EPA Waste Code(s) for this generated waste-
F003 Spent non-halogenated solvents (see 1991 Form)
F005 Spent non-halogenated solvents (see 1991 Form)
Tons Generated: 0.70
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ASHLAND CHEMICAL
BINGHAMTON, NY
System type: Transfer Facility Storage
Tons sent: 0.70 EPA ID: NYD049253719

Waste Desc.: SOLVENT BASED PAINT WASTE
EPA Waste Code(s) for this generated waste-

D001 Ignitable waste
D035 Methyl ethyl ketone
Tons Generated: 0.58
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ASHLAND CHEMICAL
BINGHAMTON, NY
System type: Transfer Facility Storage
Tons sent: 0.58 EPA ID: NYD049253719

Waste Desc.: FILTER PAPERS WITH SLUDGE WASTE
EPA Waste Code(s) for this generated waste-
D001 Ignitable waste
Tons Generated: 5.25
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ASHLAND CHEMICAL
BINGHAMTON, NY
System type: Transfer Facility Storage
Tons sent: 5.25 EPA ID: NYD049253719

Waste Desc.: WASTE ACROLEIN
EPA Waste Code(s) for this generated waste-
P003 2-Propenal or Acrolein
Tons Generated: 0.01
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
CLEAN HARBORS SVCS INC
CHICAGO, IL
System type: Transfer Facility Storage
Tons sent: 0.01 EPA ID: ILD000608471

Waste Desc.: CORROSIVE LIQUID PESTICIDE WASTE FROM PROCESS
EPA Waste Code(s) for this generated waste-
D001 Ignitable waste
Tons Generated: 0.20
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ASHLAND CHEMICAL
BINGHAMTON, NY
Tons sent: 0.20 EPA ID: NYD049253719

Waste Desc.: ORGANIC TOXIC LIQUID WASTE FROM LAB
EPA Waste Code(s) for this generated waste-
P023 Acetaldehyde, chloro- or Chloroacetaldehyde
Tons Generated: 0.01
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
POLLUTION CONTROL INDUSTRIES, INC
EAST CHICAGO, IN
System type: Transfer Facility Storage
Tons sent: 0.01 EPA ID: IND000646943

Reporting Year: 1999

Facility Name: TROY CHEMICAL CORP INC   Reporting Year: 1999
Street   : 1 AVENUE L
City   : NEWARK   State: NJ   Zip: 07105
County   : ESSEX   EPA ID: NJD002144517
Mailing Address: 1 AVENUE L
Mailing City   : NEWARK   State: NJ   Zip: 07105
Year: 1999   Total Waste   Federal Wst.
Tons Generated :   23.00   23.00
Tons Shipped   :   23.00   23.00
SIC Code(s):
Contact: EDWARD CAPASSO   Phone: 9735892500-3340
Generator Status : Large Quantity Generator (LQG)
Storage Status   : No RCRA-permitted or interim status storage
RCRA TDR Status :
Exempt TDR Status: No on-site TDR; site has no plans to develop system

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List of wastes generated by this facility:

Waste Desc.: SOLVENT BASED PAINT WASTE
EPA Waste Code(s) for this generated waste-
D001 Ignitable waste
D035 Methyl ethyl ketone
Tons Generated: 16.25
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ASHLAND DISTRIBUTION CO
BINGHAMTON, NY
System type: Transfer Facility Storage
Tons sent: 16.25   EPA ID: NYD049253719

Waste Desc.: LABORATORY WASTE WITH SOLVENTS FROM LAB
EPA Waste Code(s) for this generated waste-
D001 Ignitable waste
F003 Spent non-halogenated solvents (see 1991 Form)
Tons Generated: 0.96
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ASHLAND DISTRIBUTION CO
BINGHAMTON, NY
System type: Transfer Facility Storage
Tons sent: 0.96   EPA ID: NYD049253719

Waste Desc.: SPENT ACTIVATED CARBON FROM PROCESS
EPA Waste Code(s) for this generated waste-
F003 Spent non-halogenated solvents (see 1991 Form)
F005 Spent non-halogenated solvents (see 1991 Form)
Tons Generated: 1.00
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
UNKNOWN/BAD EPA ID
System type: Transfer Facility Storage
Tons sent: 1.00   EPA ID: NJD049253719

Waste Desc.: SPENT STYRENE-OBSOLETE RAW MATERIAL
EPA Waste Code(s) for this generated waste-

D001 Ignitable waste
Tons Generated: 0.22
Tons Generated & Managed On-site: 0.00
This waste was sent cff-site to-
ASHLAND DISTRIBUTION CO
BINGHAMTON, NY
System type: Transfer Facility Storage
Tons sent: 0.22 EPA ID: NYD049253719

Waste Desc.: FLAMMABLE FILTER MATERIAL WITH GLYCOL FROM PROCESS
EPA Waste Code(s) for this generated waste-
D001 Ignitable waste
Tons Generated: 1.76
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
CWM CHEMICAL SERVICES, L.L.C.
MODEL CITY, NY
System type: Transfer Facility Storage
Tons sent: 1.76 EPA ID: NYD049836679

Waste Desc.: WASTE CORROSIVE FILTERS FROM PROCESS
EPA Waste Code(s) for this generated waste-
D001 Ignitable waste
Tons Generated: 0.02
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ASHLAND DISTRIBUTION CO
BINGHAMTON, NY
System type: Transfer Facility Storage
Tons sent: 0.02 EPA ID: NYD049253719

Waste Desc.: FILTER PAPERS WITH SLUDGE WASTE
EPA Waste Code(s) for this generated waste-
D001 Ignitable waste
Tons Generated: 2.79
Tons Generated & Managed On-site: 0.00
This waste was sent off-site to-
ASHLAND DISTRIBUTION CO
BINGHAMTON, NY
System type: Transfer Facility Storage
Tons sent: 2.79 EPA ID: NYD049253719

END OF REPORT

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TROY CHEMICAL COMPANY, INC.
ONE AVENUE L
NEWARK, ESSEX COUNTY, NJ
EPA ID # NJD002144517

GENERAL INFORMATION AND SITE HISTORY

Troy Chemical Company, Inc. is located at 1 Avenue L in a heavily industrialized section of Newark, Essex County. The company has manufactured specialty paint additives at this 6 acre facility since approximately 1956. Prior to 1956 the site was utilized by numerous industries including American Cyanamid/Calco, Heller and Merz, and Amalgamated Dyestuff and Chemicals for the manufacture of a variety of chemicals and dyes.

The site has been subdivided many times since the early 1900s making it difficult to assess exactly who previously owned/operated which portions of the present Troy site. However, review of Sanborn Fire Insurance Maps covering the time period between the early 1900s and 1951 revealed the current Troy site, along with the Albert Steel Drum/Prentiss Drug ~~and~~ Chemical site located directly north of Troy's facility, were actually part of one large operation. This facility extended from Wilson Avenue almost to Delancey Street in a north to south direction, and from Avenue L to the railroad tracks in a west to east direction. It is unknown exactly when the larger site was divided into its present day dimensions but it is believed the final subdivision occurred sometime in the early to mid-1950s.

According to the Sanborn Maps, Heller and Merz Company, a manufacturer of colors and dyes, operated here from 1908 to 1931. From 1931 to 1951 the maps indicate that Calco Chemical Company and American Cyanamid occupied the property. The dates provided in the Sanborn Maps are very rough estimates since these maps were only updated periodically. It is probable other industries also operated at the site between 1908 and 1951 but commenced and ceased operations between the periodic updates of the maps.

A deed search at the Essex County Hall of Records indicates the following ownership chronology: (note: due to the lack of records prior to 1951, accurately determining the exact owners is difficult)

Current owners -	Troy Chemical Company, Inc.
June 24, 1980 -	New Chemical Corporation purchased the property from the Troy Chemical Corporation. In actuality, New Chemical was formed to purchase the assets of Troy Chemical, and immediately after the acquisition changed its name to the Troy Chemical Corporation, Inc. (current owners). The name New Chemical Corp. was used to avoid confusion at the time of aquisition. (note: many of the principles of the former Troy chemical Corportation are involved with Troy Chemical Corp. Inc. and New Chemical in similar capacities).

November 5, 1960 -	Troy Chemical Corporation purchased the property from the Pulaski Skyway Realty Corporation. At this time a separate industry, the Wilson Refining Company, was leasing and operating out of Building 61.
February 20, 1951 -	The Pulaski Skyway Realty Corporation purchased the property from the Pulaski Skyway Realty Company.
December 28, 1945 - and August 7, 1946	The Pulaski Skyway Realty Company purchased portions of the property from American Cyanamid/Calco.
April 20, 1938 -	Calco purchased a portion of the property from Amalgamated Dyestuff and Chemical.
December 29, 1932 -	Calco purchased a portion of the property from Harry L. Huelsenbeck, sheriff of Essex County. This portion of the site was formerly owned by the Monarch Distributing Company and apparently auctioned off in a sheriff's sale by Mr. Huelsenbeck.
March 12, 1930 -	Calco purchased 28 tracts of land from the Heller and Merz Company.

Further searching through the deeds revealed much of this area was owned by private citizens prior to 1930.

Although land use in the immediate vicinity of the site is characterized by heavy industry, numerous large residential sections of Newark, Kearny and Harrison exist within a 3 mile radius of the site. The nearest residential area to the site lies approximately 0.5 mile to the north within the City of Newark. Additionally, demography for the area cannot be limited to the established populations. Extensive "transient" populations are continuously present at the Newark Airport and the New Jersey Turnpike and may be susceptible to sudden releases from the Troy facility. The Newark Airport is approximately 1 mile south of the site and the Turnpike is less than 2000 feet to the east.

SITE OPERATIONS OF CONCERN

Troy Chemical Company manufactures a variety of specialty chemicals used in the paint industry as preservatives, biocides, dryers, rheology agents (flow agents), surfactants and dispersants. Non-mercurial biocides are the company's major product, accounting for approximately 52% of Troy's total operations (based on 1987 percentages). The remainder of Troy's total operations are incorporated in the production of driers (19%), surfactants (12%), LLBA (6%), defoamers (4%), dispersants (3%), rheology agents (3%), catalysts (<1%) and anti-skinning agents (<1%). The company also formerly manufactured mercury based compounds which were used as preservatives and bacteriocides in paint. According to company officials, mercury related operations accounted for approximately 6% (based on 1986 production totals) of the company's total operations; however, the manufacture of these compounds ceased in February 1987. The company maintains the above referenced information concerning the production totals is confidential, and should remain confidential under statutes set forth in section

Production of the speciality chemicals occurs almost exclusively through batch mixing and blending operations. Due to the extensive number of compounds manufactured by the company and the limited knowledge of the majority of the manufacturing processes, only general process schemes for organic fungicides, metallic soaps (drying agents) and mercury compounds will be discussed in this report.

The production of Troysan Polyphase products, the tradename for Troy's organic fungicides, involves mixing monoethanolamine and paraformaldehyde in a reactor and then heating the mixture. The resulting product is filtered off and the filtrant is adjusted to the proper concentration. According to company officials, no waste is generated in this process. Spent filter paper from all manufacturing processes is reportedly shipped off site as hazardous; however, the fate of the filtrate is unknown.

Metallic soaps, including those containing zinc, lead, zirconium, cobalt, copper, magnesium and calcium are manufactured in Buildings 90 and 91. Each specific type of metallic soap is manufactured to a predetermined content of the particular metal. For instance, the metallic soap Troymax Lead 24% (tradename) would be a lead soap containing 24% lead.

The general process scheme for the production of the metallic soaps involves mixing an organic acid and a solvent in a reactor. The metal source (usually a metal oxide) is added and a reaction is accomplished through heating and agitation. The metal source, as well as the organic acid and solvent, varies for the production of each specific type of soap. Excess solvent/water is separated and used in the next batch for that particular soap. According to company officials, there is no waste generated during these processes.

The production of the mercury compounds appears to have been the most involved of all of Troy's manufacturign operations. Mercury was purchased in metallic form and converted to mercuric oxide. The mercuric oxide was the major precursor in the production of organic mercuric compounds such as phenylmercuric acetate, choromethoxypropyl mercuric acetate, phenyl mercuric sulfide and phenylmercuric oleates.

This first step in this process involved washing mercury metal to triple distilled purity by allowing the mercury to fall through a column containing an acid solution. This mercury washing generated approximately 2 to 3 gallons of acid solution every few months (note: the fate of this acid solution is unknown). The washed mercury metal was then reacted with concentrated nitric acid to form mercuric nitrate. The mercuric nitrate was reacted with sodium hydroxide and the resultant mercuric oxide removed by filtration. The filtrate from this process was one of the major sources of mercury bearing wastewater, accounting for approximately 700 gallons of wastewater per batch with an average of 10 batches per week. Spills, leaks and equipment washings from this operation were another source of mercury-bearing wastewater.

In the manufacture of the organic-mercuric compounds from the mercuric oxide, only the production of the phenyl mercuric sulfide resulted in wastewaters to be discharged (not recycled back into operation).

Of the four organic-mercuric compounds manufactured by the company, only described in any detail. This process involved the mixing of benzene, acetic acid and mercuric acid in a reactor. The resulting PMA was adjusted to the proper concentration by the addition of solvent. After the reaction was complete, the vessels were rinsed with benzene and the solution generated placed in drums for use in the next batch.

Reportedly all discharged mercury bearing wastewater, including that generated in the production of mercuric oxide and phenyl mercuric sulfide, entered a sulfide precipitation treatment system. This system should not be confused with the company's overall wastewater treatment system and therefore, to avoid confusion in the report, we will refer to the two systems separately as the mercury bearing wastwater treatment system and the overall plant wastewater treatment system.

Prior to 1965, all process wastewaters, including untreated mercury bearing wastewaters, were discharged to Pierson's Creek which roughly bisects the site north to south. From 1965 to 1976, the mercury bearing wastewaters were treated by sulfide precipitation prior to being discharged to Pierson's Creek; however, all other process wastewaters were still being discharged untreated into the creek. In 1976, the overall plant wastewater treatment system was installed, receiving both the effluent from the mercury bearing wastewater treatment system (prior to cessation of the mercury operation) and the wastewaters from all of the "non-mercury" processes.

The mercury-bearing wastewater treatment system consisted of two settling tanks (A and B), a reaction and precipitation tank, a plate and frame filter press and another settling tank. The mercury bearing wastewater was discharged to Settling Tank A and liquid was allowed to overflow to Settling Tank B where the pH was adjusted to approximately 9.0. The wastewater was apparently discharged to the neutralization tank where calcium sulfide and iron sulfate were added. After agitation, the wastes were filtered and the filtrate recycled until the mercury content was reduced sufficiently for discharge to the Passaic Valley Sewage Commission (PVSC). However, prior to discharge to the PVSC the wastewater was treated in the overall plant wastewater system. Filter cake remaining on the filter paper was heated to drive off the mercury. This heating probably occurred in the three on site muffle type furnaces used by the company to recover mercury from sludges and other solid materials. A discussion of the muffle furnaces will be included in the section on the air route. After the mercury was driven from the filter cake, the remaining material was disposed of in the on site dumpster. According to Mr. Milton Nowak, Vice President of Troy Chemical, the material disposed of in the dumpster consisted basically of clay and iron oxide; however, it is unknown if this material had been analyzed.

The overall plant wastewater treatment system received the wastes from the mercury bearing wastewater treatment system in addition to waste streams from other company processes. However, as was previously stated, the company reincorporates much of their cleaning solutions generated from washing the process equipment back into the next reaction for that particular process, thereby limiting the amount of wastewater generated. Herein lies a disparity between various reports as the company's IWMF worksheet states wastewaters entering the treatment system are "generated from the washing of reactors used during production process operations".

The wastewater from the washings and spills is collected in sumps located in the process building. From here the wastewater is discharged to a 10,000 gallon collection tank. An oil/solvent layer is allowed to form on the surface and is then discharged to a 5,000 gallon tank where it is stored until a large enough quantity is collected for offsite removal. According to company officials, it takes approximately 1.5 to 2 years for a large enough quantity to accumulate to make it economically feasible for removal. This waste is considered hazardous. ← They are not listed as TSDF

The "water" remaining in the 10,000 gallon collection tank is then pumped to a second 10,000 gallon tank where neutralization and precipitation occur. The wastewater is then filtered and the filtrate is discharged to the Passaic Valley Sewage Commission (PVSC) under provisions provided in a sewage connection permit (#20403290). Troy Chemical continuously monitors the effluent discharge to the PVSC for LEL and pH. The effulent is also monitored quarterly for Biological Oxygen Demand (BOD), Total Suspended Solids (TSS) and petroleum hydrocarbons (PHCs). The effluent was formerly monitored for mercury triweekly prior to the cessation of the mercury processes.

The fate of the precipitate, filtrant and spent filter material (cloth) generated during the filtration and precipitation stages of the overall wastewater treatment system is unknown. According to Ed Capasso, Environmental Manager for Troy, the filter material consists of a cloth mesh; however, he believes most of the solid passes through. Also of interest is the fact that the wastewater remaining after the oil/solvent layer is not analyzed for volatile organics because it is not believed to be necessary. However, this does not take into consideration the possible presence of substances such as TCE and tetrachloroethylene which are more dense than water and would sink rather than float.

Another source of confusion concerning the Troy facility is the determination of the company's RCRA status. In November 1980, the company submitted a Part A RCRA application for storage of hazardous wastes in containers and tanks. The company was subsequently listed as a RCRA TSD facility. However, when the EPA requested submission of the Part B application in 1982, the company claimed they "need not store hazardous wastes on site for more than 90 days and accordingly hereby withdraws its application for a RCRA permit". Troy was delisted to generator only status in October 1983 by the USEPA and, after considerable controversy, by the NJDEP in August 1984. The two separate dates for delisting occurred as a result of variance in the state and federal regulations concerning classificastion of TSD facilities. Under New Jersey regulations, a facility which stores hazardous wastes in tanks for a period of time is considered a TSD whereas, under federal regulations, tank storage of hazardous waste must occur for more than 90 days for a facility to be classified as a TSD.

The company's RCRA status becomes even more confusing in light of the fact that hazardous waste (the oil/solvent layer from the wastewater treatment plant) is currently stored on site in tanks for a period exceeding 90 days. Based on this information, the company would be considered a TSD under both state and federal regulations. However, under criteria set forth in NJAC 7:14A-4.2(a), the company avoided TSD classification by being considered a Industrial Waste Management Facility (IWMF) under Division of wastewater treatment facility receiving an influent wastewater which is a hazardous waste and generating a residue (the oil/solvent layer) which is also considered hazardous. Since the hazardous waste storage tank is an integral part of the wastewater treatment system, the tank falls under IWMF regulations. A "gray" area exists between IWMF and RCRA classification in that a company can be considered a TSD as well as an IWMF if the residue generated is stored in containers for longer than 90 days. However, the same does not apply for tank storage. Since containers and tanks would both be considered RCRA regulated units under normal circumstances, the loopholes which exist in the current regulations do not appear to be justifiable. The major concern with the company being classified as an IWMF only is that no secondary containment is required around the IWMF hazardous waste units.

As was previously stated, the oil/solvent layer from the wastewater treatment process is collected in a tank until enough has been generated to make it economically feasible to transport it off site. Solvents Recovery Service (SRS) of Linden, New Jersey formerly received the majority of Troy's oil/solvent wastes. According to Mr. Cappasso, the last shipment of the hazardous oil/solvent material occurred sometime in 1986. Mr. Capasso stated another shipment should be made sometime in 1988.

Other hazardous waste (from a RCRA standpoint) generated at the facility included spent sorbent booms from Pierson's Creek as well as filtrate and spent filter paper from the manufacturing processes. It is believed these wastes are stored in drums; however, drum storage reportedly occurs for less than 90 days. The filtrate and filter paper are assumed to be hazardous and have been shipped by AETC to an incinerator in North Carolina operated by Stablex. The sorbent booms which were placed in Piersons Creek to contain spills will be discussed in the section on surface water.

A review of aerial photographs at the NJDEP, Office of Environmental Analysis revealed numerous suspicious areas which also warrant further investigation. Areas of concern from the photographs reviewed will be discussed in turn.

Photographs covering the period 1934 to 1940 (photos dated November 1934, April 6, 1940 and April 28, 1940) revealed that most of the current Troy site was undeveloped; however, a few buildings were present on the eastern side of Pierson's Creek. These buildings were probably part of the American Cyanamid/Calco site previously referenced. It appears that landfilling operations had begun throughout much of the remainder of the current Troy site, especially on the western side of Pierson's Creek. In the 1954 photo, what appears to be drums are located in the landfill area. It is unknown if the landfilling was related to the American Cyanamid/Calco operations.

Photographs dated April 7, 1951 and December 5, 1953 revealed a more defined landfill area. An access road to the landfill(which is outlined in white) is visible in the 1951 photograph. Buildings and a few above ground tanks are present on the eastern side of the creek. The 1953 photo reveals a suspicious white area in the approximate center of the landfill and possible stained ground near what would be the northern border of the current Troy site.

The most revealing of all of the photographs was that taken on April 20, 1961. More buildings and aboveground tanks are present on the eastern side of Pierson's Creek. Although it cannot be substantiated by the aerial photographs only, it appears hundreds of drums were stacked for burial in the southwestern quadrant of the landfill area. It is difficult to assess if this suspicious area would actually be on the present-day Troy site as the landfill area appears to have extended well beyond (in a westerly direction) the present day Avenue L.

The March 25, 1972 aerial photograph revealed the majority of the facilities are still located on the eastern side of Pierson's Creek although aboveground tanks are also present on the western side of the creek. Most, if not all of the site is still unpaved.

Photographs from August 6, 1978 revealed the company's operations had grown immensely. Above ground tanks and thousands of drums are evident throughout the site. Most of the site still appears to be easily accessible.

The most recent photographs reviewed were taken on March 23, 1986. Most of the site appears to be unpaved and resembles its present day state; however, one suspicious area was noted in the southwestern portion of the property.

GROUNDWATER ROUTE

The Troy Chemical Company site lies within the Peidment physiographic province of the Appalachian Highlands physiographic division. Geology in the area is characterized by formations of Recent, Pleistocene and Triassic Age deposits.

Each of these units as they relate to the site will be discussed in turn. General information pertaining to geology in the vicinity of the site was obtained from the USGS Special Report #10 entitled, "Preliminary Report on the Geology and Groundwater Supply of the Newark, New Jersey Area" and Special Report #28 entitled "Groundwater Resources of Essex County, New Jersey". More site specific data was obtained from a hydrogeological study performed for Troy Chemical by Wehran Engineering in 1981. This study included installation and monitoring of six onsite monitor wells.

Since the two streams which transverse the site are actually man-made drainage ditches, unconsolidated recent deposits, originating from stream deposition are not an integral part of the site geology.

According to boring logs developed during installation of the onsite monitor wells, the uppermost "geologic" unit at the site would consist of fill material ranging from 6 to 10 feet in depth. The presence of fill is consistent with the information obtained during review of the aerial photographs. It is interesting to note that Boring Log 3A indicates a huge void was encountered at a depth of 6.2 feet. The location of Boring 3A would very roughly approximate the area of possible drum burial observed in the 1961 aerial photograph. According to the boring logs, the fill material appears to consist of concrete, bricks, cinders, wood and boulders as well as sand and gravel. Monitor Well 3A is screened exclusively in this unit.

The first naturally occurring geologic unit encountered would be the unconsolidated sediments of Pleistocene Age. The Pleistocene sediments could be divided into two general categories, stratified or unstratified drift. These sediments consist basically of clay, silt, sand, gravel and boulders. The deposits in the Newark area are mostly considered unstratified drift deposits and are therefore not heavily utilized as a groundwater source since sufficient quantities of water can only be obtained from deposits in the stratified drift. For the purpose of this report, the lithologic units described in the Wehran Engineering boring logs occurring between the fill material and the residual bedrock encountered in Boring 1 will be considered as the Pleistocene Deposits. According to the boring logs these include lacustrine as well as glacial till deposits. Only one boring (Boring 1) was progressed into the Brunswick Formation, therefore the thickness of the Pleistocene deposits at the site can only be assessed from this one boring (assuming the Pleistocene deposits are the entire unit between the fill and the Brunswick Formation). The depth of this unit, as determined from Boring 1, is approximately 65 feet thick. According to the boring logs, no extensive aquifer system (sand or gravel) is present at the site, however most of the units within the Pleistocene deposits, especially within Borings 2 and 3, were reported to be saturated, possibly indicating that this system does not serve as an adequate aquitard and is capable of groundwater storage and transmittal. Therefore, vertical and horizontal migration of contamination is possible. All of the wells, with the exception of Monitor Well 3A, are at least partially screened within the Pleistocene deposits. Groundwater flow in these deposits appears to be in a south-southeast direction.

The last unit encountered is the Brunswick Formation, which consists of consolidated shales in the vicinity of the site. Although the primary porosity of the shale itself is extremely low and inadequate for storage and transmittal of groundwater, secondary porosity resulting from cracks and fractures provides ample space for groundwater storage. Numerous industrial and cooling water wells in the vicinity of the site draw from the Brunswick Formation. Review of well records at the NJDEP/Division of Water Resources/Bureau of Water Allocation also indicated a few wells in the Newark area utilize the Brunswick Formation for domestic purposes; however, officials of the Newark City Water Department claim that everyone in Newark is connected to the city water supply. This water is obtained from the Pequannock and Wanaque water sheds. Only Boring 1 was progressed into the Brunswick Formation; however, the well screen was ended in the Pleistocene deposits. Due to the nature of the Brunswick Formation, with groundwater transmittal occurring through cracks and fractures, no definitive grounwater flow direction can be ascertained.

Contamination of the Brunswick Formation resulting from site activities is possible due to the leaky nature of the Pleistocene deposits and the fact that the Brunswick Formation probably receives most of its recharge from the overlying units.

The six Monitor Wells were sampled on four occasions between August 1981 and May 1982 by the Wehran Engineering Company. Split samples were obtained by NJDEP on two of these occasions. A summary of the available groundwater data is included in Tables 1 through 6.

The wells were initially sampled by Wehran Engineering on August 25, 1981 detected in all six wells; however, only the concentration in Monitor Well 1A (9.3 ppm) exceeded the Groundwater Quality Criteria Guidelines of 5 ppm. Mercury was detected in five of the wells with the concentrations above the Groundwater Quality Guidlelines of 2 ppb in each of these wells. Concentrations of mercury ranged from 85 ppb in Monitor Well 2 to 22.96 ppm in Monitor Well 2A.

Both the NJDEP and Wehran collected samples from the six wells on November 11, 1987 (see tables 2 and 5). Samples collected by the NJDEP were analyzed for mercury, copper, lead, zinc, pesticides/PCBs, chloride and COD. The Wehran samples were analyzed for purgable organics, pesticides/PCBs, COD, chloride, mercury, copper, lead and zinc. Analysis of the Wehran samples again revealed mercury contamination above the Groundwater Quality Guidelines in the same five wells as during the August 25, 1981 sampling episode. In addition, the levels of copper in Monitor Wells 1A, 2A, 3; lead in 2, 2A and 3; benzene in 1A, 2 and 3A; chlorobenzene in 1A; tetrachloroethylene in well 3A; 1,1,1-trichloroethane in 3A; and TCE in 2A and 3A were above the Groundwater Quality Criteria. Toluene was also detected in low concentrations in all six wells. Extremely high concentrations of chlorides were also detected in all six wells, but this probably attributable to salt water infiltration. The NJDEP samples also revealed concentrations of mercury above the Groundwater Quality Criteria in every well with the exception of Monitor Well 2. The metals fraction for the Monitor Well 2 sample was not properly preserved and therefore not analyzed. It should be noted that although the mercury concentrations were above the Groundwater Quality Criteria, they were at levels much lower than those detected in the Wehran samples. The discrepancies in the concentrations may be a result of differing sampling and/or analytical protocols. Also, since it cannot be ascertained whether the samples were actually split properly between the two sampling groups (DEP and Wehran), it is possible the aliquots collected by each group had varying concentrations of contaminants. Of special interest in the NJDEP samples was the presence of 7.5 and 6.5 ppb of Aroclor-1254 in Monitor Wells 2 and 2A, respectively. Since Aroclors do not readily migrate through the soil column and into groundwater, the source of the Aroclor contamination in these wells may be the result of "tainted" fill or the actual disposal and burial of Aroclor wastes. Another possibility is that migration was facilited by the presence of solvents which acted as carriers. The wells were again sampled by Wehran Engineering on May 14, 1982 (see Table 3). The samples were analyzed for mercury only, with the concentrations in all six wells above the Groundwater Quality Criteria. The highest concentration, at 12.5 ppm was again detected in Monitor Well 2A.

On May 27, 1982, the wells were sampled again by NJDEP and Wehran (see Tables 4 and 6). The NJDEP samples were analyzed for a variety of parameters including arsenic, cadmium, lead, mercury, hexavalent chromium, cyanide, chloride, COD and volatile organics. The Wehran samples were analyzed for mercury only. The concentrations of mercury in all six wells for both the NJDEP and Wehran samples were above the Groundwater Quality Criteria, with the concentrations detected in the Wehran samples again well above the concentrations in the NJDEP samples. Here again the differences in concentration may be attributable to varying sampling and/or analytical procedures. Other analytes surpassing the Groundwater Quality Guidelines included arsenic in Wells 1, 1A and 3A; lead in 2 and 3; cyanide in 2A and benzene in 1A, 2A and 3A; and chlorobenzene in 1A and 2A. Numerous aromatic compounds were also detected in many of the samples.

On November 17, 1989, NJDEP Bureau of Planning and Assessment ~~(BPA)~~ conducted a Site Inspection (SI) which included the sampling of Monitor Wells 2 and 2A to be analyzed for the Target Compound List (TCL) plus 30 peaks and PHCs. Analysis of Monitor Well 2 showed levels of cadmium (18 ppb), chromium (241 ppb), lead (1,140 ppb), PHCs (7,600 ppb), and benzene (2,600 ppb) above Groundwater Quality Criteria Guidlines as well as low levels of other organic compounds. Analysis of the deeper well (Monitor Well 2A) revealed levels of chromium (118 ppb), lead (515 ppb), mercury (4.96 ppb), benzene (2,200 ppb), and toluene (18 ppb) over clean-up levels as well as low levels of other organic compounds. See Table 11 for complete results.

Monitor Wells 1 and 1A were not sampled due to the fact that they had been destroyed and covered over with macadam. Monitor Wells 3 and 3A were not sampled because the covers could not be removed without removing part of the well casing.

It is important to note that many of the contaminants detected including mercury, lead, copper, zinc and benzene are highly utilized in many of the company processes possibly implicating Troy Chemical as at least a partial contributor to groundwater contamination in the area. Also noteworthy is the presence of contamination in both the shallow and deep monitor wells indicating vertical migration of the contaminants. The extremely high concentrations of mercury consistently detected in Monitor Wll 2A, especially in the Wehran samples, may represent evidence of a small pocket (plume) of contamination in the vicinity of this well.

SURFACE WATER ROUTE
Two small drainage ditches exist within the Troy Chemical site. The two ditches converge near the approximate southern border of the Troy site, eventually discharging to Newark Bay. Tank farms, process buildings and storage areas line both sides of the westernmost drainage ditch known as Pierson's Creek which bisects the site north to south. According to reports, Pierson's Creek was originally part of a private drainage system which extended to a stream known as Dead Creek. This system was constructed sometime in the mid 1800s when this area of Newark was first being developed. Although the current origin of Pierson's Creek is unknown (Dead Creek cannot be located on present day maps), it appears to run underground upstream of the Troy Site, at least partially through the Albert Steel Drum/Prentiss Drug Site, finally surfacing at a point approximately 50 yards north of Troy's property. As the creek enters the Troy site, the drainage ditch turns into a concrete flume. The City of Newark installed the flume in 1956; however, it is not known if it is continuous until the creek terminates at Newark Bay. In June 1977, the company installed a containment wall along the flume to prevent the migration of spilled/leaking materials into Pierson's Creek; however, numerous inspections revealed cracks and holes in the wall which permitted materials to discharge directly into the creek.

The easternmost creek roughly borders the eastern edge of the Troy site and is labeled as a tributary to Pierson's Creek on various reports. This creek was reportedly part of Newark's storm drainage system as early as 1910. The origin of this creek is unknown. This creek is also concrete lined.

As previously stated, all of Troy's process wastewaters (including mercury bearing wastewaters) had been discharged untreated into Pierson's Creek from the mid-1950s to 1965. From approximately 1965 to 1976, mercury bearing wastewaters were treated by sufide precipitation prior to being discharged to the creek; however, all other process wastewaters continued to be discharged untreated. Finally in 1976, the overall plant wastewater treatment system was installed resulting in the treatment of all wastewater before discharge. The fate of precipitate generated from the sulfide precipitation process (operating from 1965 to approximately 1987) is unknown.

In July 1977, Troy applied for a NJPDES permit to discharge noncontact cooling water, boiler blowdown and condensates into Pierson's Creek. This permit (#0031453) was effective from May 31, 1978 to September 30, 1980. Six discharges, designated 001 to 006, where included in the initial permit. The following describes the sources of the discharges:

001 - non contact cooling water from reactor vessels and blowdown from cooling towers.

002-003 - boiler blowdown - only active in winter.

004-006 - steam condensate from steam traps on heaters and other steam lines.

In March 1980, Troy submitted a renewal application for their NJPDES permit, however as a result of deficiencies in the renewal application due in part to the transfer of the company's assets, which occurred at this time, the NJDEP refused to recertify Troy's NJPDES permit. Although the permit was not renewed until August 1985, the company continued to discharge to Pierson's Creek. According to Michael Russo of the NJDEP/Division of Water Resources/Bureau of Industrial Waste Management, a company would be allowed to continue discharging under the previous permit limitations as long as the revised permit renewal application was submitted in a timely manner, which apparently occurred in this case. Prior to obtaining the renewed permit, Troy discontinued the discharges from Discharges 002 to 006. Under provisions of the renewed permit, which is valid until September 30, 1990, the company is required to monitor Discharge 001 on a monthly basis for flow, pH, temperature, TSS, COD and oil and grease. In addition, this discharge is monitored quarterly for benzene, mercury, zirconium, cobalt and iodine. Review of the Discharge Monitoring Reports (DMRs) for the period covering January 1986 to June 1988 revealed the company has had only one excursion of any of the permit limitations. The excursion occurred in April 1988 when the Total Suspended Solids limitation of 50 ppm was exceeded by a TSS of 70 ppm. It should also be noted, that 20 ppb of benzene was reported in the January 1988 DMR.

Although the DMRs, especially those from 1986 to the present, show commendable NJPDES compliance, non NJPDES regulated sampling (either sampling conducted prior to the company obtaining their NJPDES permit or samples of non NJPDES regulated discharges) reveal gross contamination of Pierson's Creek and its sediment. Due to the extensive sampling of discharges to the creek, the creek sediment and the creek itself, each individual sample will not be discussed in this report. However, a brief description of significant data collected will follow.

On August 18, 1977, the NJDEP/Division of Water Resources collected samples of discharges to Pierson's Creek, as well as samples of the creek itself. The sources of the discharges included an onsite septic tank, cooling water from the Mercury Distillant Plant, the fungicide plant and the boiler room. The parameters selected for each sample were specific to the discharge source location. For example, the septic tank discharge was analyzed for parameters usually associated with sewage such as nitrates, nitrites, ammonia, chloride and various indicator parameters. The indicator parameters include, but are not limited to, color, pH, total solids and COD. (Note: these indicator parameters were also analyzed in other samples but for the remainder of the report will be referenced only as indicator parameters). Two water samples, one upstream and one downstream of the septic tank, were collected from Pierson's Creek and analyzed for the same parameters as the septic tank discharge samples. Of interest in the two stream samples was the increase in ammonia and nitrites in the downstream sample. The highest level of these contaminants was detected in the discharge sample itself with the level in the downstream sample approximately one half the concentration detected in the discharge sample:

	DISCHARGE SAMPLE	DOWNSTREAM SAMPLE
Ammonia	26.1 ppm	16.4 ppm
Nitrite	0.010 ppm	0.0006 ppm

The results of these samples indicate that the company's septic system was discharging sewage into Pierson's Creek. Dye testing of the company's toilet facilities during a previous NJDEP inspection revealed the location of the septic tank discharge.

The sample of the cooling water discharge from the Mercury Distillant Plant was analyzed for chromium (total and hexavalent), copper, lead, zinc, mercury and indicator parameters. High levels of mercury (42.2 ppb) as well as low concentrations of lead (0.001 ppm), copper (0.020 ppm), total chromium (0.002 ppm) and zinc (0.525 ppm) were detected in this sample.

The Fungicide Plant sample was analyzed for mercury, lead, zinc, chromium (hexavalent and total), calcium, iodine, pesticides and indicator parameters. In addition to 39 ppb of mercury, significant concentrations of iodine (4.0 ppm) and ronnel (8.7 ppm), an insecticide, were detected in this sample. Low concentrations of zinc, lead and total chromium were also detected. The pH of this sample was reported to be 10.3.

Stream and discharge samples were again collected by the NJDEP on September 1, 1977. Two stream samples were collected from Pierson's Creek, one upstream sample near the northern portion of site just as the stream enters the Troy site and one onsite sample from ~~near~~ the Mercury Reclaiming Plant. Both samples were analyzed for mercury, lead, zinc, chromium (hexavalent and total in the downstream sample, total only in the upstream), sulfate and indicator parameters. Of greatest significance in these two samples was a greater than five fold increase in mercury concentration in the downstream sample indicating a discharge from an onsite source was contributing to contamination of the creek.

Two discharge samples were also collected on September 1, 1977. Sources of these samples consisted of overflows from the wooden cooling water tank and the boiler room. Both of these samples were analyzed for similar parameters including mercury, lead, zinc, sulfate, total chromium, calcium and indicator parameters. In addition, the sample from the wooden cooling tower was analyzed for iron. Mercury, zinc, calcium and sulfate were detected in low concentrations in both of the samples. Iron and total chromium were also detected in the wooden cooling tower and boiler room overflow samples, respectively.

Mercury and zinc were detected in a sample of cooling water discharge from the Mercury Distillant Plant collected by the NJDEP on December 8, 1977. Besides zinc and mercury this sample was also analyzed for arsenic and indicator parameters.

Nine samples, including four surface water and five sediment samples, were collected along and near Pierson's Creek during an inspection by the USEPA on June 6, 1979. All of the samples were analyzed for mercury content only. Two of the water samples were collected directly from Pierson's Creek, one upstream and one downstream of the Troy facility. A significant increase in mercury in the downstream water sample (56 ppb versus 0.5 ppb) indicates the Troy facility is the source of the largest portion of the contamination. It should be noted that the concentration of mercury detected in the sediment samples decreased in the downstream versus upstream sample. This may be due to migration of insoluble forms of mercury from the upgradient Albert Steel Drum/Prentiss Drug site which also has documented mercury contamination. However, since Pierson's Creek can be considered tidal, contaminated sediment can also be carried short distances upstream during tidal stages. This effect (higher concentrations in upstream versus downstream samples) would not be apparent in water samples unless sampling occurred as the tide was coming in.

As a result of the information obtained during the June 6, 1979 inspection, the USEPA requested a search warrant to investigate the site under provisions provided in section 1318(a) (B) of the Clean Water Act. In the request for the warrant, the USEPA indicated the company was discharging mercury in possible violation of their NJPDES permit. The warrant was subsequently issued by the U. S. District Court for the New Jersey District with an investigation being conducted by the USEPA on July 12, 1979. During the investigation, water and sediment samples were collected from Pierson's Creek at locations 5 and 100 feet upstream of the Troy Site, 100 and 250 yards downstream and at two locations within the site. Of the four samples collected on site (two water and two sediment), two samples (one water and one sediment) were collected approximately 50 feet upstream of the southern edge of the plant near Dicharge 001, and the two other samples (one water and one sediment) were collected near the mercuric oxide manufacturing area. All of the water samples were analyzed for heavy metals and Total Organic Carbon (TOC). The sediment samples were analyzed for mercury only. Four additional water samples were collected from Pierson's Creek and analyzed for volatile organics. Of the four additional samples, one was collected approximately 5 feet upstream of the Troy Site, one within the site, downstream of all the manufacturing processes and two at locations 100 and 250 yards downstream of the Troy property. A summary of the data is included in Table 7.

The majority of volatile organics detected in the downstream water samples were at higher concentrations than in the upstream (background) sample, indicating most of the contamination is emanating from the Troy site. Also of interest are the concentrations of mercury in the sediment samples, especially those collected from within the Troy site boundary. A substantial increase in mercury concentration in Pierson's Creek is evident in the samples collected from onsite sources versus samples collected from upgradient offsite sources. Although the mercury concentrations detected in the upgradient offsite samples should be considered significant (140 ppm, 100 feet upstream and 191 ppm, 5 feet upstream), the concentrations in the onsite samples (22,400 ppm and 11,600 ppm) are indicative of continuous discharges and/or spills of insoluble forms of mercury over several decades. Also of interest is the increase of mercury concentration in the downstream (3,120 ppm, 100 yards downstream and 244 ppm, 250 yards downstream) versus the upgradient offsite samples (see above).This further substantiates that the company's activities have seriously impacted the quality of Pierson's Creek. In addition to the sediment samples from Pierson's Creek, one sediment sample was also collected from the easternmost creek. Mercury was detected at 83,200 ppm in this sample.

The NJDEP performed additional sampling of the creek and discharges to such on August 2, 1979. A total of eleven samples were collected including seven discharge samples, two stream samples from Pierson's Creek and two sediment samples from Pierson's Creek. Apparently, one of the discharge samples actually discharged to the sanitary sewer, and therefore will not collected from the designated NJPDES Discharges 001, 005 and 006. The sample from Discharge 001, which was analyzed for volatile organics, mercury, arsenic, COD, and oil and grease, contained low concentrations of mercury (11 ppb), oil and grease (1.6 ppm) and COD (19 ppm).

Discharge 005 was analyzed for mercury and COD only, with 45 ppb of mercury and 12 ppm COD being detected. Similar concentrations of mercury (51 ppb) and COD (8 ppm) were detected in the Discharge 006 sample which was analyzed for volatile organics in addition to mercury and COD. Although the limitations for the six discharges in the initial NJPDES permit (issued in May 1978) are unknown, the concentrations detected in these samples were well below the current NJPDES limitation for Discharge 001. It should be noted however, that no mercury limitation has been established. One of the other discharges sampled on August 2, 1979 reportedly originated from the oil/water separator influent which discharges to Pierson's Creek (the oil/water separator was apparently located within Pierson's Creek).

This sample was analyzed for volatile organics and oil and grease. Significant quantities of benzene (726 ppb), tetrachloroethylene (500 ppb), and 1,2-dichloroethane (7250 ppb) were detected in this sample. A sample of the intake from Pierson's Creek leading to the oil/water separator also revealed the presence of benzene, tetrachloroethylene and 1,2-dichloroethylene, but at much lower concentrations than in the oil/water separator influent sample entering Pierson's Creek. The last discharge sample collected originated from the onsite locker room and was analyzed for parameters associated with sewage. Extremely high coliform counts in this sample indicated untreated sewage was being discharged directly into the creek.

Two water samples were collected from the creek itself, one from a location 5 feet upstream of the northern property line and one directly downstream of the southern property line. The upstream sample was analyzed for oil and grease, total chromium, arsenic, mercury and volatile organics; the downstream sample for phenols, oil and grease, total chromium, arsenic, volatile organics, mercury and pesticides.

A comparison of the concentrations of mercury, benzene, and arsenic detected in the two samples revealed a very slight increase in the downstream sample for each analyte, again indicating the company was contributing to surface water contamination. Phenols (102 ppb) and diazinon (1.62 ppb) were also detected in the downstream sample. Tetrachloroethylene, 1,2-dichloroethane, toluene and xylenes were detected in the upstream sample but not in the downstream sample, leading to the conclusion that the Troy Chemical Company is not the sole contributor to the contamination of Pierson's Creek. Sediment samples were also collected at upstream (10 feet north of the northern property line) and downstream (immediately inside the southern site boundary) locations. Both samples were analyzed for volatile organics, mercury, arsenic and total chromium. Although the concentration of mercury was lower in the downstream sample, 4.3 ppm versus 4.6 ppm in the upstream sample, the concentrations of arsenic and chromium were approximately four and ten times greater respectively, in the downstream versus upstream samples. Also of interest were the concentrations of chloroform (>50 ppm), 1,2-dichloroethane (7.815 ppm) and benzene (12.5 ppm) in the downstream sample. No volatile organics were detected in the upstream sample. A point worthy of reiteration is are (or have been) heavily utilized in the company's processes.

On April 28, 1980, six discharge samples and four soil samples were collected by the NJDEP. The soil samples will be discussed in ~~the~~ section concerning soils. Two of the discharge samples were collected from stormwater discharges to the easternmost drainage ditch (the tributary to Pierson's Creek) and were to be analyzed for mercury, copper, lead, arsenic and zinc. However, due to insufficient sample quantities, only mercury analysis was performed on one of the samples; the arsenic analysis was deleted on the other sample. In one of the samples a mercury concentration of greater than 3 ppm was reported. Mercury droplets were reportedly only as further substantiation of the company's continuing contribution to contamination of Pierson's Creek, but also as evidence that secondary containment at the site is inadequate to prevent spills and leaks from migrating to the creek. Based on these results, it could also be concluded that spills are not contained and removed promptly creating numerous "non-point source discharges" which ultimately permit the contaminants to migrate to the creek via stormwater runoff, overflows, etc.

Wehran Engineering collected water and sediment samples from Pierson's Creek in August of 1981 (exact date unknown). Three sediment samples identified as Upstream #1, Midstream #2 and Downstream #3 were analyzed for total solids, volatile solids, COD and mercury. The supernatant from the sediment samples was analyzed for total organic carbon and mercury. Review of the data for sediment and supernatant samples revealed elevated levels of mercury in the upstream samples relative to the downstream samples. However, all three samples were collected well within the Troy site, therefore, the upgradient sample cannot be considered truly indicative of the contamination being contributed by offsite sources. It should also be noted that many of the mercury process areas were located along Pierson's Creek near the Upstream #1 sample location. Also of interest in the sediment samples was the progressive increase in the concentration of volatile solids and COD in the midstream and downstream samples revealing the presence of oxygen demanding constituents (possibly the volatile solids) in the middle and lower sections of the creek. Two water samples were also collected from the creek, one just as the creek enters the site (background) and one as the creek leaves the site. The samples were analyzed for mercury and zinc with elevated levels of both contaminants present in the downstream sample. Here again, the increase in contamination in the downstream sample revealed soluble forms of zinc and mercury are continuously being discharged to the creek from the Troy site.

On May 1, 1985, one sample was collected at NJPDES Discharge 001 by the NJDEP. The sample was analyzed for indicator parameters including chloride and COD. A field pH measurement using pH paper was also taken, with the reported value of 5.0 being below the NJPDES permit limitation of 6.0 standard units. Also, the level of COD (220 ppm) exceeded the NJPDES permit limitation of 50 ppm. The level of COD was estimated, however, since the sample was improperly preserved.

During the November 17, 1989 NJDEP, BPA Site Inspection, five surface water and seven sediment samples were collected and analyzed for the TCL plus 30 peaks. Surface Water/Sediments 1 through 4 were collected in Pierson's Creek with 1 being slightly upgradient of the facility and 2,3 and 4 located progressively downgradient.

The following contaminants were detected in Surface Water (SW)-1: benzene (10 ppb), lead (103 ppb), mercury (10.8 ppb) and PHCs (5,300 ppb). Analysis of SW-2 revealed detectable levels of volatile and semi-volatile organic compounds as well as elevated levels of lead (105 ppb), mercury (8.2 ppb) and PHCs (1,400 ppb). Detectable levels of volatile and semi-volatile organic compounds were found in SW-3 as well as elevated levels of 1,1,1-trichoroethane (210 ppb), trichoroethene (100 ppb), benzene (70 ppb), tetrachloroethene (60 ppb), lead (194 ppb), mercury (7.5 ppb) and PHCs (1,700 ppb). Analysis of SW-4 revealed detectable levels of volatile and semi-volatile organic compounds along with lead (263 ppb), mercury (66 ppb) and PHCs (7,400 ppb). SW-5, which was collected from a storm drain in the center of the current operational portion of the site, showed elevated levels of methylene chloride (460 ppb), lead (230 ppb) and PHCs (28,000 ppb).

While the surface water samples show a pattern of slightly elevated levels of organics, metals and PHCs from upstream to downstream samples, results of the concurrent sediment sampling are much more indicative of long-term discharges.

Progressively increasing levels of some organic and inorganic substances were found in Sediments-1 through 3 with Sediment-4 exhibiting lower values than Sediments-2 and 3. Of significance to this investigation is the pattern of increasing volatile organic, copper, lead and mercury concentrations. Table 8 represents upstream to downstream concentrations in Pierson's Creek sediment. See Table 11 for complete results.

Additionally, 4,4'-DDD, cadmium, chromium and zinc were detected in significant amounts in these samples; however, the higher upstream concentrations may be indicative of contaminants migrating from offsite sources.

Sediments-5, 6 and 7 were collected in the tributary to the east of the site, with Sediment-5 located upstream, Sediment-6 midstream and Sediment-7 downstream. As with Sediments-1,2 and 3, these samples indicate a pattern of increasing contamination from upstream to downstream locations. Table 9 summarizes the significant results.

The numerous samples which have been collected by the NJDEP, the USEPA and Wehran Engineering indicate that both permitted and unpermitted discharges by the company have had a detrimental impact on surface water quality in Pierson's Creek and its tributary. Although most of the samples collected were from continuous or common sources, another source of contamination from the conpany's activities, direct spill discharges, should also be considered. Historically, spills, leaks and poor housekeeping have contributed to contamination of the surface water by migrating to the creeks via storm water runoff, overflows, etc. Since the runoff, overflows, etc. would actually dilute the concentration of contaminants present, these discharges, although significant, may not be as deleterious to the creek as the direct spill discharges of pure product and/or wastes. Review of available information has revealed at least three "minor" spills of various substances including naptha, mineral spirits and sewage have occurred at the site since February 1987. These spills were reportedly contained and the spilled materials removed before any of the materials migrated off site. It is unknown if any unreported spills have occurred

Prior to 1987, however, direct spill discharges to Pierson's Creek apparently were commonplace. Many of these spills were not reported to the NJDEP by the company, as required in the Spill Act, but rather from complaints or "tips."

One such spill incident occurred in January of 1984 with the NJDEP being notified of the spill by the New Jersey Division of Criminal Justice. Samples collected by Division of Criminal Justice personnel revealed the creek upgradient of the site was clear, while downgradient of the site a brown and green liquid covered the surface of the stream. Field testing indicated the brown liquid was flammable. The exact source of the spill could not be determined by Marc Gruslovic of the NJDEP who responded to the spill, however the source was believed to be from near or within Building 91. Building 91 is currently a process building and probably served a similar function at the time of the spill. It is unknown if the aforementioned samples were ever analyzed. Troy Chemical contracted Clean Venture to contain and remove the spill material. The company claimed the green material observed was a dye, formerly manufactured by American Cyanamid when they operated at the site, which emanates from the ground whenever it rains.

A series of spills had also occurred in the fall of 1978 and the winter of 1979. The succession of events pertaining to these spills were reported by Ed Faille of the NJDEP. These events as they pertain to discharges to Pierson's Creek will be discussed in the following paragraphs. Further information concerning Mr. Faille's inspections will be discussed in the Other Considerations section under the heading "Unstable Containment of Wastes."

The first spill was inadvertently discovered by Mr. Faille on October 12, 1978 while inspecting the adjacent Albert Steel Drum site. Mr. Faille reported that oil was present in Pierson's Creek within the Troy site boundry. Upon further investigation of the Troy facility, numerous point source and non-point source discharges were discovered entering Pierson's Creek. The point source discharges included, "a pump that was leaking around the packing, discharging the waste materials into the stream", and a sump pump within the containment area for a tank whose contents were reported to be "metallic dryers and metallic naphthalene". The non-point source discharges included substances leaching into the creek from varoius onsite locations. The exact source of the oil observed by Mr. Faille was not reported, however, officials of Troy Chemical claimed that it originated from upstream sources. Several samples were colected during the inspection but apparently were never analyzed.

On October 19. 1978, Mr. Faille reinspected the site and observed numerous environmental problems including a white substance in the stream sediment. Several samples were collected but apparently were never analyzed.

Mr. Faille again inspected the site on October 26, 1978. During the inspection, it was observed that many of the discharges had been discontinued and a collection box was installed to prevent the leachate from discharging directly to the creek. In addition, the white sediment was removed from the creek and a boom was placed in the creek near the downstream property boundary. An inspection on November 1, 1978 revealed the collection systems were working effectively and the company was about to install an oil skimmer in the creek. According to company officials the material entrapped in the collection box was placed in drums for disposal off site. The disposal location for these wastes is unknown.

On January 17, 1979, a spill originating from a process room behind the offices (probably Building 91), had again entered Pierson's Creek. The spilled material reportedly contained mineral spirits, high flash naptha, oleic acid, naphthenic acid and alkali soluble methacrylate polymer. In addition, the overall conditions of the entire facility had deteriorated to its previous state. The company contracted Olsen and Hassold to contain the spill which, due to the large quantities involved, took more than a week to contain and remove. The spill reportedly extended downstream to Delancey Street. In response to the spill and the continuous discharges leaching from the walls of concrete flume, filter fences were installed by Olsen and Hassold. Leach boxes were also to be installed at the south side of the site.

A followup inspection on January 29, 1979, however, revealed another spill had entered the creek and again apparently originated from Building 91. According to Troy's maintenance personnel, they were ordered to pump this material into the stream because heavy rains caused flooding in the process building. Mr. Nowak, Vice President for the company, denied that the maintenance personnel had beeen ordered to discharge to the creek. The spilled material was subsequently rerouted to the company's pretreatment system under the direction of Mr. Faille and a contractor (Olsen and Hassold, Inc.) was hired to clean up the spill.

A followup inspection was performed by Mr. Faille on December 11, 1979. Although the overall facility conditions had improved, the pollution abatement systems installed in Pierson's Creek were not operating properly. Company officials reported they would repair these systems to proper operating conditions. However, a final inspection on December 13, 1979 by NJDEP personnel had revealed the conditions at the site were again deteriorating and the pollution abatement devices in the creek were not working properly.

Another noteworthy incident occured during an inspection by NJDEP personnel on June 2, 1977. At this time, Milton Nowak, Vice President of Troy Chemical, claimed that the only discharge entering the easternmost drainage ditch originated from a cesspool overflow. The exact location and current status of the cesspool is unknown. During the inspection, numerous discharges were also observed entering Pierson's Creek.

Based on the information available it is clearly evident that past and present activities by Troy Chemical have seriously impacted the quality of water and sediment in Pierson's Creek and its tributary, both onsite and downstream of the facility. The surface water in this area is used for recreational, industrial and commercial purposes.

AIR ROUTE

The NJDEP/Division of Environmental Quality has received numerous complaints concerning odors and releases from the Troy facility, however inspections conducted to verify these complaints have been inconclusive.

On August 30, 1983, an explosion in one of the reactor vessels resulted in a release of contaminants including butyl isocyanate into the atmosphere. Although the exact cause of the explosion was not determined, it was believed an improperly operating agitation unit within the reactor was at least partially responsible. According to company officials the reactor contained hydroiodo propene which was dissolved in high flash naptha. The reactor was then charged with butyl isocyanate which normally results in an exothermic reaction. Apparantly the mixture was not properly agitated, allowing a layer of butyl isocyanate to form and causing the reaction to proceed with an increase in heat and pressure which could not be controlled by the cooling coils. According to reports, the entire contents of the reactor vessel was emptied in the explosion.

Improperly operating muffle type mercury recovery furnaces have also resulted in atmospheric releases of contaminants. On May 28, 1981 a stack test was performed on the three recovery furnaces to determine if mercury vapors were being emitted. The furnaces had been operating for approximately two years under a temporary certificate (#40322) prior to the stack test. The furnaces were designed to recover mercury from various solid materials including sludges and batteries. These materials would be placed on a pan which was sealed inside the furnace. The furnace was heated by underfired gas burners to a temperature where the charge material (sludge and batteries) reached the vaporization point of mercury. At this point the mercury to be recovered volatilized resulting in mercury emissions which were run through a series of water cooled condensors. The liquified mercury was then collected from the condensors. However, during the stack test it was noted very little flow was being emitted through the ejector Venturi Scrubber where the emission test was to take place indicating emissions were leaking from the system before reaching the air pollution control device (the scrubber). It was determined mercury contaminated emissions were leaking from the charge doors on the furnaces. It was also believed that contaminants other than products of combustion were being emitted from the stacks. As a result of the improperly operating furnaces and control devices, notices of violation were issued to the company by the DEQ and it was recommended further stack testing be conducted prior to issuance of an approved permit (certificate). According to the Division of Environmental Quality's stack log for the company, the muffle furnaces were deleted from active operation on June 12, 1985. It is unknown if a subsequent stack test was ever performed on these furnaces.

To date, no environmental air sampling data for the site is available.

It should be noted that 74 stacks are listed on DEQ's stack log for the facility. Of the 74, 59 currently have certificate (permit) numbers although many have been deleted (currently inactive) and others are temporary. The sources of the stacks include but are not limited to, above ground tanks, reactor vessels and furnaces.

During a October 6, 1989 NJDEP,BPA Presampling Assessment (PSA) ambient air readings of up to 18 ppm on the OVA as methane and over 20 ppm on the HNu as isobutylene were observed. Additonally, numerous point sources of elevated readings were noted as well as a strong paint or acrylic odor.

SOIL

Much of the site was recently paved, thereby covering most of the exposed soil surfaces; however, inspections by the NJDEP in the late 1970s and early 1980s revealed visibly contaminated soil throughout the site, apparantly the result of spills, leaks and overall poor housekeeping. On numerous occasions leaking drums were observed being stored on the exposed ground surface. Many areas of the site were also noted to contain mercury droplets.

On May 7, 1976, it was reported that cobalt hexoate and calcium hexanoate were leaking from one of the tank farms into the surrounding soil, eventually discharging into one of the on site drainage ditches. Reportedly the contaminated soil was subsequently removed and disposed of at Kin Buc Landfill in Edison, New Jersey. Apparently no analysis of the soil in this area was performed before or after it was removed, therefore it cannot be determined if all the contaminated soil was properly removed.

In September 1977, the company collected soil samples at various locations throughout the site. These samples were analyzed for mercury content only. Concentrations of mercury ranged from 0.046 ppm in the sample identified as Clean Fill #2 collected near the polyphase plant, to 0.55 ppm in the sample indentified as Container #1 taken near Avenue L. The sample collection procedures and exact sample locations are unknown.

On April 28, 1989, NJDEP collected four soil samples in addition to the surface water samples which were referenced previously. The data is summarized on Table 8. The most contaminated of the four samples was collected near an onsite dumpster. The exact location of this dumpster is unknown. This sample was analyzed for copper, lead, arsenic, mercury, pesticides and volatile organics. As indicated in Table 8, seven of the contaminants detected were above the NJDEP/Recommended Cleanup Levels for these contaminants. In fact, the concentration of each individual volatile organic detected was above the cleanup level for total volatiles of 1 ppm. Relatively high concentrations of DDT and many of its breakdown products were also detected. Another highly contaminated sample was collected on the south side of the Fungicide Plant. This sample was analyzed for copper, lead, arsenic, zinc and mercury, with the concentrations of copper, lead, zinc and mercury above the NJDEP recommended action/cleanup levels.

Two soil samples were also collected from drum storage areas where obvious spillage had occurred. One of the storage areas is located on the south side of the Warehouse Building. The sample collected from this location was analyzed for copper, lead, arsenic, zinc, mercury, pesticides and volatile organics. The concentrations of copper, zinc, mercury and total volatile organics (as well as benzene and methyl isobutyl ketone, individually) were above the NJDEP recommended action/cleanup levels. The second drum storage area where a sample was collected was located in the "yard area", however it is unknown exactly where the yard area is located within the site. The sample collected from this area was analyzed for copper, lead, arsenic, zinc, mercury and volatile organics. Only the level of mercury exceeded the NJDEP action/cleanup levels.

Since each of these four samples was labeled as a composite sample, the concentrations reported were probably lower than the actual concentration due to the dilution which occurs when samples are composited.

During the November 17, 1989 NJDEP/BPA Site Inspection, five soil samples were collected and analyzed for the TCL plus 30 peaks and PHCs. Soil-1S and Soil-1D were collected in the north-central portion of the site to the west of Pierson's Creek at depths of 8 to 10 inches and 16 to 18 inches, respectively. Both samples showed concentrations in excess of clean-up levels for volatile and semi-volatile organic compounds, numerous heavy metals and PHCs. The shallow sample showed consistently higher levels than the deep samples for the majority of contaminants detected. Soils 2 and 3 were also located in the north-central portion of the site but on the east side of Pierson's Creek, with Soil-2 being slightly to the north of Soil-3. Soil-2 was collected at a depth of 12 inches while Soil-3 was collected at 0 to 6 inches. Low, but detectable, levels of some semi-volatile organic compounds and pesticides were found in both samples. In Soil-2, lead (153 ppm), mercury (355 ppm) and PHCs (340,000 ppb) were detected above clean-up levels. Also above clean-up levels in Soil-3 were: lead (246 ppm), mercury (736 ppm) and PHCs (960,000 ppb). Soils-4 and 5 were collected along the southern border of the site. Soil-4, which was collected at a depth of 2.5 feet, showed detectable levels of semi-volatile organic compounds as well as elevated levels of barium (1320 ppm), copper (174 ppm), lead (3920 ppm), mercury (2590 ppm) zinc (1320 ppm) and PHCs (4,4000,000 ppb). Soil-5 was collected in the western portion of the site at a depth of 6 inches. Analysis revealed detectable levels of volatile organics and elevated levels of semi-volatiles, arsenic (55.7 ppm), barium (584 ppm), copper (185 ppm), lead (2840 ppm) mercury (210 ppm), zinc (1835 ppm) and PHCs (14,000,000 ppb). Complete results of all soil samples can be found on Table 11.

Sampling events over the years have confirmed widespread, extreme contamination of substances that can be directly attributed to Troy's processes such as copper, lead, zinc, mercury and benzene.

Since most of the surficial soil throughout the site actually consists of fill material, the potential for many of the contaminants to migrate vertically through the soil column is magnified. Therefore, it is likely contamination present in the surficial soil is at least one of the sources the documented groundwater contamination.

It should be noted that the origin of fill material at the site is unknown.

DIRECT CONTACT

Two incidents of direct contact attributable to the Troy Chemical Company have been reported.

The first occurred on August 30, 1983 when an explosion in one of the reactors resulted in the release of contaminants including butyl isocyanate, hydroiodopropene and high flash naphtha. This incident was discussed in the section on Air Route. According to the NJDEP/Trenton Dispatch Incident Report concerning a complaint from a nearby resident, a giant coral-colored cloud was observed emanating from the company. This was followed by a gray mist and, according to the Incident Report, caused the complaintants eyes to burn. The exact number of people affected during this incident is unknown.

The second incident occurred in October of 1980. According to reports received by the NJDEP, an employee of the company was being treated for a severe case of mercury poisoning (100 ppm in the bloodstream). The cause of the poisoning was apparently a result of unsafe operational practices by the company.

The potential for offsite personnel to come into contact with hazardous materials on site is limited as the site is surrounded by a fence and security personnel are present 24 hours/day. However, offsite personnel may encounter hazardous substances which have migrated off site via Pierson's Creek.

As can be seen by the August 1983 incident, nearby populations including the transient populations at the Newark Airport and the New Jersey Turnpike are also susceptible to sudden atmospheric releases of hazardous materials from the company.

FIRE AND EXPLOSION

At least one fire and one explosion have been reported at the site.

The fire occurred in a manufacturing area on November 1, 1984, apparently the result of sparks from a compressor igniting solvents used in the machinery. Troyson Lead 36% was being filtered at the time of the fire. The fire was reportedly contained by the on site sprinkler system, however the Newark Fire Department assisted in controlling the fire. Minor spillage of unknown chemicals occurred during the incident, some of which may have entered the sewage system via runoff.

An explosion occurred on August 30, 1983 but will not be discussed in this section as it was previously discussed in the Air Route section.

Additonally, an employee interviewed during the October 6, 1989, NJDEP, BPA stated that there had been numerous explosions in Building 91 in the past.

Due to the nature (flammables, reactives, combustibles etc.) of materials used and stored by the company, a potential for future fires/explosions exists. Past inspections by the NJDEP revealed that extremely poor housekeeping practices employed by the company had permitted many chemicals to intermix. If similar conditions persist, which is likely, incompatible materials may mix resulting in potentially explosive and/or hazardous conditions.

OTHER CONSIDERATIONS

DAMAGE TO FLORA AND FAUNA

The deterioration of water quality in Pierson's Creek as a result of releases of hazardous substances may have a detrimental impact on aquatic biota in the creek. Aquatic organisms in Newark Bay may also be affected since Pierson's Creek discharges to the bay.

Migratory bird species are also susceptible to damage as the site lies along the flyway for many of the birds and hazardous substances, especially from spills and leaks, are easily accessible to the birds.

CONTAMINATION OF FOOD CHAIN

The presence of many bioaccumulative and biomagnification threats such as DDT, mercury and lead in soil, surface water and sediment leads to a potential for food chain contamination. The aquatic ecosystems of Pierson's Creek and Newark Bay appear to be the most susceptible to food chain contamination.

DAMAGE TO OFFSITE PROPERTY

The Albert Steel Drum/Prentiss Drug Site located directly north of Troy Chemical was recently acquired by the Newark Housing and Redevelopment Authority for redevelopment. During an investigation of the property by the Newark Engineering Department and the U.S. Attorney's Office on June 8, 1979, hundreds of bags labeled "Troysan-Mercury Acetate" were found strewn throughout the Albert Steel Drum/Prentiss Drug Site. The bags were reportedly empty (unused) but a silver gray material was observed on the ground surface in the vicinity of the bags. Samples of the silver gray material were collected and analysis revealed the presence of phenylmercuric acetate and high concentrations of mercury (0.5% or 5000 ppm). Since mercury and phenylmercuric acetate are major components of Troysan, it is likely the silver gray material was off-spec Troysan and was disposed of on the Albert Steel Drum/Prentiss Drug Site with excess container bags. It is probable other wastes from Troy Chemical were also disposed on the Albert Steel Drum/Prentiss Drug Site.

During many of the previous inspections at the Troy site by the USEPA and NJDEP, in which stream and/or sediment samples were collected from Pierson's Creek, background (upgradient) samples were collected from Pierson's Creek on the Albert Steel Drum/Prentiss Drug Site. Since many of the Troysan bags and the silver gray material observed on the Albert Steel Drum/Prentiss Drug Site were found near the drainage ditch (Pierson's Creek), it is questionable whether the upgradient samples actually monitor background conditions, as it appears Troy Chemical is at least partially responsible for upgradient (background) contamination.

In addition, the migration of contaminants offsite via Pierson's Creek may also have impacted downstream offsite properties.

CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs

As was previously stated, Troy Chemical was issued a sewer connection permit (#204013290) to discharge treated process wastewater, various blowdowns and sanitary sewage to the Passaic Valley Sewage Commission (PVSC) Treatment Plant. The discharge to PVSC is monitored continuously for LEL and pH as well as quarterly for BOD, TSS and petroleum hydrocarbons. The discharge was formerly monitored triweekly for mercury prior to the cessation of the mercury processes. This permit is in conjunction with the NJPDES permit by rule category which delegates regulatory responsibility for discharge to an approved Publically Owned Treatment Works (POTW) to the POTW itself. In addition, as per federal regulations, the POTW is required to develop an Industrial Pretreatment Program (IPP) ensuring contributor compliance with the POTW regulations. On numerous occasions Troy Chemical has exceeded limitations of these permits allowing contamination, including excessive quantities of mercury, to be discharged to the sewage system.

Prior to connection to the PVSC sewage system, process wastewaters were discharged to Pierson's Creek and sanitary wastes to the onsite septic tank/leach field system. The leach field system apparently also discharged to Pierson's Creek; however, Newark City ordinances prohibited the use of septic systems in areas serviced by sanitary sewers and New Jersey State Regulations prohibited the use of septic systems in flood prone areas. Since the company was in violation of both state and local regulations they were required to tie into the PVSC system. The exact date in which they were permitted to tie into the PVSC system is unknown; however, as early as March of 1977, a former Troy Chemical employee alleged that the company's newly installed septic tank was actually tied into the sanitary sewer system. The septic system reportedly had a cutoff valve which permitted wastes, including biocides and flammables to be discharged to the sanitary sewer system at will; however, these allegations could not be substantiated.

A sample of the discharge to the city sewer was collected by the NJDEP on September 1, 1977 and analyzed for iodine, mercury, zinc, chromium (hexavalent and total), sulfate, chlorides, volatile organics and a variety of indicator parameters including pH. Analysis of the sample revealed low concentrations of mercury, total chromium, lead and zinc and 17,400 ppm of chloride. The volatile organic analysis was postive for methylene chloride and carbon tetrachloride. The pH of the sample was 11.6, which is above the current sewage connection permit limitation; however, it is unknown what the permit limitation for this parameter was at the time of the incident.

On August 2, 1979, a discharge to the sewage system was again collected by the NJDEP. This sample was analyzed for volatile organics, mercury, total chromium, arsenic, and oil and grease. A field pH of this sample was reported to be over 12.0. Extremely high concentrations of benzene (1,350 ppb), tetrachloroethylene (1,368 ppb), 1,2-dichloroethene (19,250 ppb), and oil and grease (367 ppm) were detected in this sample. Low concentrations of total chromium and arsenic were also detected. Due to interference, the concentration of mercury in the sample could not be determined. Of greatest significance in this sample is the presence of volatile organics which either entered the sewage system through the company's sanitary sewer discharge or the chemical sewer discharge. If these contaminants originated from the chemical sewer, which enters into the overall plant wastewater treatment system, it could be concluded that this treatment system is not effective in removing all solvents, especially those more dense than water. If the contaminants originated from the company's sanitary system this may have represented a continuous illegal discharge to the public sewage system.

From January 1979 to May 1979, the PVSC conducted investigations of Troy's discharges by collecting numerous 24 hour composite samples from the manhole outside of the Troy site. All of the samples were analyzed for mercury with the results revealing concentrations of mercury ranging from 57 ppm to 365 ppm. It should be noted that these samples were analyzed by three different laboratories and although the concentrations detected by the different laboratories varied somewhat, the levels of mercury in all of the samples were cause for concern. Based on this analysis, it was estimated that the company was discharging 327 pounds of mercury to the sewage system each day. Since the PVSC system offered only primary treatment at this time, approximately 90% of this mercury was being discharged with the effluent to Newark Bay.

Although the concentrations of mercury discharged had diminished considerably since this investigation, the sewage connection permit limitation of 0.4 lbs per day was exceeded on numerous occasions from 1984 to 1986. During the monitoring period from April 1, 1986 to June 30 1986, the mercury limitation was exceeded on 59 of the 60 analyses performed.

In addition, changes to the PVSC rules and regulations in 1984 limited the amount of flammable materials which could be discharged; however, inspections of the LEL instruments installed on site by PVSC personnel had revealed the instrument has not operated properly since its installation. On occasions when the instrument was functioning properly, readings as high as 48% LEL were recorded indicating flammables were being discharged. It should be noted that during two of the PVSC inspections, the manhole cover to the sewer line where the LEL meter was situated was removed allowing the flammables to vent and resulting in lower than actual readings. It is likely this was a common practice by the company in order to achieve compliance with the LEL limitations since the LEL concentrations were recorded continuously on a strip chart which was then inspected by PVSC during their inspections.

Other violations of PVSC rules and regulations and permit conditions included deficiencies of the Baseline Monitoring Report (sewer permit equivalent to NJPDES Discharge Monitoring Report) and excursions of pH limitations.

Deficiencies of the Baseline Monitoring Report included the aforementioned excursions of mercury limitations, not properly preserving samples and not submitting the Monitoring Reports on time. The pH limitation was exceeded on September 9, 1986 when the pH of the discharge was reported to be above the permit limit of 10.5 for almost 1.5 hours prior to the PVSC being notified. According to Troy officials, the excursion was a direct result of a faulty pH meter registering false readings.

UNSTABLE CONTAINMENT OF WASTES

As previously addressed, waste management practices by the Troy Chemical Company, especially prior to 1986, have been inadequate and have contributed to soil, air, surface water and groundwater contamination. Many of these practices were referenced in previous sections and therefore will only be discussed briefly here.

Site conditions were best exemplified in various reports concerning inspections conducted by the NJDEP and the USEPA in the late 1970s and early 1980s. Although the numerous inspections spanned a period of greater than five years, overall site conditions remained relatively unchanged. Included in many of these inspection reports was reference to 4000 plus drums of wastes, raw materials and unknowns which were being stored throughout the site. Many of the drums were also reported to be in poor condition and were leaking. Since many of the drums were being stored on the unprotected ground surface, leaks and spills from the drums may have had a direct impact on soil contamination at the site.

In addition to the overall poor conditions of drums, tanks, etc. and the poor operational practices undertaken by the company, the inadequacy of secondary containment should also be considered. As was stated previously, many of the drums were stored on the unprotected ground surface, and even in areas where wastes were being stored on concrete or asphalt, berms were either non existent, inadequate or insecure to contain spills or leaks. Inspections had also revealed numerous cracks in the containment walls surrounding the tank farms and, in some instances, materials were observed leaking from the cracks. Numerous pipes were also observed throughout the site, many of which were leaking or discharging untreated wastes directly to Pierson's Creek. It should also be noted that reference was made to waste pits on site during an inspection by NJDEP personnel on June 6, 1977. The location and current status of these pits is unknown.

Another point worthy of consideration is the ultimate fate of the spills, leaks, drums, etc. which were removed for offsite disposal. In many cases, especially that relating to the removal of the 4,000 plus drums, the actual fate of the materials could not be determined due to conflicting reports concerning the removal and disposal. One report claims approximately 1,000 drums were hauled offsite for disposal by the Lightman Drum Company to Chemical Waste Management in early 1980. A report dated June 19, 1981 again states approximately 1,000 drums were removed by the Lightman Drum Company, but the disposal location was not reported. It is uncertain if these reports are actually addressing the same removal episodes. Yet still another report dated December 13, 1979 by Mr. Edward Faille of the NJDEP stated wastes from thousands of the drums were disposal via the PVSC, but the exact method of disposal was not specified. If the wastes were disposed in the sewage system, it is likely this represented an unpermitted illegal discharge as file reviews did not reveal any approvals from the PVSC for such disposal. The company claims that no manifests for the removal or disposal of any of these drums are available.

ILLEGAL/UNAUTHORIZED DUMPING

Known and suspected instances of illegal/unauthorized dumping were also addressed in previous sections and include the disposal of Troysan on the Albert Steel Drum/Prentiss Drug Site and those incidents observed on the aerial photography.

One alleged incident of illegal disposal which has not been referenced in previous sections occurred in the early 1980s and involved disposal of mercury wastes in the on site dumpster. Allegedly, mercury wastes were mixed with sand in 55-gallon drums and disposed of in the dumpster. Surveillance by the NJDEP, however, could not substantiate these allegations.

ENFORCEMENT ACTIONS

Numerous enforcement actions have been levied against the company resulting from violations of NJPDES, RCRA, air quality and local sewage commission regulations. A brief outline of some of the past regulatory/enforcement actions and the issuing agency is as follows:

- Issuing agency: NJDEP/Division of Hazardous Waste Management

August 19, 1987 - Amended Administrative Order and Notice of Civil Administrative Penalty Assessment (AAO/NCAPA)for failing to conduct semi-annual drills with local emergency response agencies and for failing to include in their contingency plan the emergency actions to be undertaken by facility personnel in case of releases of hazardous materials.

July 6, 1987 - Administrative Order and Notice of Civil Administrative Penalty Assessment (AO/NCAPA) for failing to arrange hazardous waste containers so the identification label is visible and for the violations referenced above. The violation for failing to arrange the containers properly was later rescinded resulting in the Amended Administrative Order of August 19, 1987.

July 10, 1984 - Notice of Violation (NOV) for failing to submit a TSD annual report for 1983.

- Issuing agency: EPA

June 16, 1981 - Complaint, Compliance Order, and Notice of Opportunity for a Hearing regarding storage of ignitable waste without rendering them non-ignitable or protecting them from ignition; failing to operate the facility in a manner which would minimize the possibility of fires, explosions, releases, etc.; lacking adequate internal communication/alarm systems; and for failing to take precautions to prevent accidental ignition of ignitable wastes.

- Issuing agency: NJDEP/Division of Environmental Quality

June 14, 1984 - Notice of Prosecution (NOP) for failing to obtain a permit to construct, install or alter control equipment from the Department.

August 27, 1981 - Notice of Prosecution (NOP) for allowing benzene to be emitted into the atmosphere without registering the equipment with the Department.

June 25, 1981 - Notice of Prosecution (NOP) for utilizing three muffled mercury recovery furnaces, one of which was functioning improperly thereby permitting emissions to escape from the charging door.

March 26, 1981 - Notice of Prosecution (NOP) for using a recovery furnace without the Venturi Scrubber in use or functioning properly; and for failing to obtain a "Permit to Construct, Install or Alter Control Apparatus or Equipment" and a "Certificate to Operate Control Apparatus or Equipment" from the Department prior to installing/using a carbon adsorbtion unit.

July 14, 1980 - Notice of Prosecution (NOP) for using a mercury still and condenser without water service to the water layer emission reducer.

January 18, 1979 - Notice of Prosecution (NOP) for failing to obtain a "Permit to Construct, Install or Alter Control Apparatus or Equipment" prior to installing an 1800 gallon reactor.

July 10, 1978 - Notice of Prosecution (NOP) for failing to obtain a "permit" or "certificate" prior to installing/operating control equipment.

- Issuing agency: NJDEP/Division of Water Resources

June 28, 1987 - Directive Letter issued as a result of observations made during a Compliance Evaluation Inspection requiring Troy to cease unpermitted discharges of boiler blowdown water and steam condensate to Pierson's Creek, provide a timetable for implementation of a Best Management Practices Plan; and to inform DWR of any future spills through written notification.

February 24, 1987 - Thirty day notice for failure to submit a Discharge Monitoring Report.

March 27, 1986 - Thirty day notice for failure to submit a Discharge Monitoring Report.

June 21, 1985 - Directive Letter to correct deficiencies noted during a Compliance Evaluation Inspection. Deficiencies cited included violations of permit limitations for COD, poor housekeeping throughout the site, and the use of the company's lab to perform the NJPDES analysis however the lab was not certified for this analysis.

- Issuing agency: Passaic Valley Sewage Commission

May 9, 1986 - Numerous deficiencies were noted during a compliance inspection regarding the use of an LEL monitor which resulted in submission of a violation letter by the PVSC.

August 17, 1986 - Violation of PVSC rules and regulations for failing to submit a Baseline Monitoring Report.

August 13, 1986 - Numerous deficiencies were again noted in the company's Baseline Monitoring Report. Most of the deficiencies regarded improper reporting of various aspects of the Baseline Monitoring Report.

August 18, 1986 - Violation of PVSC Rules and Regulations by exceeding limitations of mercury on 59 of 60 occasions for the period spanning 4/1/86 to 6/30/86.

It should be noted that the ultimate result of many these enforcement actions is unknown. However, some of the actions were rescinded as a result of corrective actions taken by the company.

PRIORITY DESIGNATION

Becuase damage to human health or the environment is not likely due to the location of the site in a highly industrialized area, a low prioity is assigned.

RECOMMENDATIONS

If feasible, investigation of this site should be coordinated in conjunction with the RI/FS at the adjacent Albert Steel Drum/Prentiss Drug Site. It appears these two sites were actually part of one large operation for a long period of time and therefore many of the problems associated with both sites may be comparable. Additional sampling to determine the vertical and horizontal extent of contamination may be necessary.

Further investigation of the suspicious areas observed on the aerial photography is also necessary. Boring and/or sampling, as appropriate, is recommended for these areas. A full photographic interpretation should also be included to identify other areas of concern(i.e. the cesspool as referenced during the June 2, 1977 inspection and the waste pits referenced during the June 6, 1977 inspection).

The company should provide unambiguous information concerning the removal and ultimate fate of hazardous and potentially hazardous materials from the Troy facility from 1956 to date. This information should include, but not be limited to, the removal and disposal of spills, contaminated soils, sludges, process wastes (filter paper, residues, etc.) and the 4000 plus drums.

A definitive RCRA/IWMF status should be applied to the facility to address the gray areas currently present in the regulations including tank storage and secondary containment issues. Also, the NJDEP/Division of Hazardous Waste Management/Bureau of Environmental Evaluation and Cleanup Responsibility Assessment should be notified as to the cessation of the mercury processes in 1987 to determine if ECRA status is applicable.

Future inspections of the facility should address operational practices and equipment utilized by the company to ensure proper measures have been undertaken by the company to eliminate the occurrence of releases and spills. Secondary containment should also be upgraded or repaired in response to the insecure conditions noted during previous inspections by the NJDEP.

The company's current SPCC plan is totally inadequate as it does not address potential releases or spills from "non-oil" related storage areas. Because of the enormous quantities of hazardous materials stored on site and the numerous releases from the storage areas in the past, a plan addressing all storage areas is necessary. Secondary containment of the oil/solvent storage tank should also be taken into consideration although IWMF regulations do not require secondary containment for this type of unit.

Further development of the site, including the planned redirection of Pierson's Creek should be restricted until all environmental concerns have been addressed.

Due to the documented contamination of the soil, sediment surface water and groundwater by a variety of hazardous constituents, the lead for this case should be assigned to the Bureau of Case Management (BCM) with a Responisble Party search referred to the Bureau of Compliance and Technical Services (BCTS).

TABLE 1

WEHRAN ENGINEERING SAMPLING RESULTS
AUGUST 25, 1981 RESULTS IN PPM (MG/L)

PARAMETER	MW1	MW1A	MW2	MW2A	MW3	MW3A
MERCURY	0.385*	0.185*	0.085*	22.96*	0.502*	<0.0004
ZINC	1.0	9.3*	1.2	3.3	4.0	0.37

ALL SAMPLES WERE ANALYZED FOR ZINC AND MERCURY
* INDICATES CONTAMINATION ABOVE NJDEP ACTION/CLEANUP LEVELS.

TABLE 2

932250184

WEHRAN ENGINEERING SAMPLING RESULTS
NOVEMBER 17, 1981 - RESULTS IN PPM (MG/L)

PARAMETER	MW1	MW1A	MW2	MW2A	MW3	MW3A
MERCURY	0.0223*	0.0313*	0.507*	1.0333*	0.2382*	-
COPPER	0.94	1.02*	0.70	1.70*	1.00*	0.72
LEAD	<0.05	<0.05	0.20*	0.15*	<0.05	1.00*
ZINC	0.57	0.24	1.97	0.73	0.13	0.83
ALDRIN	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
BHC	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
B-BHC	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
BHC	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
BHC	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
CHLORDANE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
4,4'-DDT	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
4,4'-DDE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
4,4'-DDD	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
DIELDRIN	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
ENDOSULFAN	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
B-ENDOSULFAN	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
ENDOSULFAN SULFATE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
ENDRIN	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

TABLE 2 (cont.)

PARAMETER	MW1	MW1A	MW2	MW2A	MW3	MW3A
ENDRIN ALDEHYDE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
HEPTACHLOR	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
HEPTACHLOR EPOXIDE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
PCB-1242	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
PCB-1254	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
PCB-1221	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
PCB-1232	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
PCB-1248	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
PCB-1260	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
PCB-1016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
TOXAPHENE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
ACROLEIN	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
ACRYLONITRILE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
BENZENE	<0.010	0.036*	0.015*	<0.010	<0.010	0.074*
BIS (CHLOROMETHYL) ETHER	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
BROMOFORM	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
CARBON TETRACHLORIDE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
CHLOROBENZENE	<0.010	0.347*	<0.010	<0.010	<0.010	<0.010
CHLORODIBROMOMETHANE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

TABLE 2 (cont.)

PARAMETER	MW1	MW1A	MW2	MW2A	MW3	MW3A
CHLOROETHANE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
2-CHLOROETHYLVINYL ETHER	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
CHLOROFORM	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
DICHLOROBROMOMETHANE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
DICHLORODIFLUOROMETHANE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
1,1-DICHLOROETHANE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
1,2-DICHLOROETHANE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
1,1-DICHLORETHYLENE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
1,2-DICHLOROPROPANE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
1,2-DICHLOROPROPYLENE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
ETHYLBENZENE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
METHYL BROMIDE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
METHYL CHLORIDE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
METHYLENE CHLORIDE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
1,1,2,2-TETRACHLOROETHANE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
TETRACHLOROETHYLENE	<0.010	<0.010	<0.010	<0.010	<0.010	0.032*
TOLUENE	<0.010	0.012	0.012	0.013	0.012	0.010
1,2-TRANS-DICHLOROETHYLENE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
1,1,1-TRICHLOROETHANE	<0.010	<0.010	<0.010	<0.010	<0.010	2.180*

TABLE 2 (cont.)

PARAMETER	MW1	MW1A	MW2	MW2A	MW3	MW3A
1,1,2-TRICHLOROETHYLENE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
TRICHLOROETHYLENE	<0.010	<0.010	<0.010	0.011*	<0.010	0.23*
TRICHLOROFLUOROMETHANE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
VINYL CHLORIDE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
COD	112	546	437	812	-	325
CHLORIDE	110	457*	2283*	3652*	125	1127*

ALL SAMPLES WERE ANALYZED FOR PURGEABLE ORGANICS, PESTICIDES, COD, CHLORIDE, MERCURY, CC
LEAD, AND ZINC.

* INDICATES CONTAMINATION ABOVE NJDEP ACTION/CLEANUP LEVELS.

TABLE 3
WEHRAN ENGINEERING SAMPLING RESULTS
MAY 14, 1982 - RESULTS IN PPM (MG/L)

PARAMETER	MW1	MW1A	MW2	MW2A	MW3	MW3A
MERCURY	0.036*	0.027*	0.018*	12.50*	0.055*	1.85*

ALL SAMPLES WERE ANALYZED FOR MERCURY ONLY.
* INDICATES CONTAMINATION ABOVE NJDEP ACTION\CLEANUP LEVELS.

TABLE 4

WEHRAN ENGINEERING SAMPLING RESULTS
MAY 24, 1982 - RESULTS IN PPM (MG/L)

PARAMETER	MW1	MW1A	MW2	MW2A	MW3	MW3A
MERCURY	0.035*	0.224*	0.047*	25.29*	0.059*	0.024*

ALL SAMPLES WERE ANALYZED FOR MERCURY ONLY.
* INDICATES CONTAMINATION ABOVE NJDEP ACTION/CLEANUP LEVELS.

TABLE 5
NJDEP SAMPLING RESULTS
NOVEMBER 17, 1981 - RESULTS IN PPM (MG/L)

PARAMETER	MW1	MW1A	MW2	MW2A	MW3	MW3A
MERCURY	.0056*	.008*	-	.074*	.041*	.0176*
COPPER	.811	.449	-	2.055*	1.027*	1.840*
LEAD	.333*	.048	-	.556*	.156*	.630*
ZINC	1.445	.191	-	1.43	1.065	4.010
COD	385	628	399	958	780	688
CHLORIDE	110	800*	980*	1150*	2400*	510*
AROCHLOR 1254	ND	ND	.0075*	.0065*	ND	ND

ALL SAMPLES WERE ANALYZED FOR COPPER, MERCURY, LEAD, ZINC, PESTICIDE/PCBs, CHLORIDE AND COD. ALTHOUGH THE ENTIRE PESTICIDE/PCBs SCAN WAS RUN ON ALL SAMPLES, AROCLOR 1245 WAS DETECTED IN ONLY TWO OF THE SAMPLES.

* INDICATES CONTAMINATION ABOVE NJDEP ACTION/CLEANUP LEVELS.

TABLE 6
NJDEP SAMPLING RESULTS
MAY 24, 19822 - RESULTS IN PPM (MG/L)

PARAMETER	MW1	MW1A	MW2	MW2A	MW3	MW3A
MERCURY	.0005	.0005K	.0065*	.0335*	.073*	.265*
ARSENIC	.194*	.188*	.005K	.016	.005K	.244*
CADMIUM	1K	.004	.002	.001	.005	.001
LEAD	.013	.045	.143*	.013	.511*	.016
CHROMIUM, HEXAVALENT	.005K	.013	.005K	.008	.024	.005K
CYANIDE	.001K	.001K	.024	.691*	.001K	.483*
CHLORIDE	120	640*	2570*	1330*	520*	760*
COD	365	415	180	590	114	510
1,1-DICHLOROETHANE	ND	ND	ND	.030*	ND	.058*
1,2-DICHLOROTHENE	ND	ND	ND	.520*	ND	.150*
1,1,1-TRICHLOROETHENE	ND	ND	ND	ND	ND	1.360*
TRICHLOROETHYLENE	ND	ND	ND	.380*	ND	.100*
TETRACHLOROETHYLENE	ND	ND	ND	.110*	ND	.007*
BENZENE	ND	.012*	ND	.700*	ND	.062*
TOLUENE	ND	.004	.004	.006	ND	.036
ETHYLBENZENE	ND	ND	ND	ND	ND	.023
P-XYLENE	ND	ND	ND	ND	ND	.006
N-PROPYLBENZENE	ND	ND	ND	ND	ND	.041

TABLE 6 (cont.)

PARAMETER	MW1	MW1A	MW2	MW2A	MW3	MW3A
TERT-BUTYLBENZENE	ND	ND	ND	ND	ND	.023
SEC-BUTYLBENZENE	ND	ND	ND	ND	ND	.029
1,2,4-TRIMETHYLBENZENE	ND	ND	ND	.026	ND	.060
2,3-BENZOFURAN	ND	ND	ND	ND	ND	.010
1,1,2-TRICHLOROETHANE	ND	ND	ND	.008	ND	ND
O-XYLENE	ND	ND	ND	.009	ND	ND
CHLOROBENZENE	ND	1.030*	ND	.010*	ND	ND
O-CHLOROTOLUENE	ND	ND	ND	.030	ND	ND
P-CHLOROTOLUENE	ND	ND	ND	.021	ND	ND
1,3,5-TRIMETHYBENZENE	ND	ND	ND	.013	ND	ND
P-DICHLOROBENZENE	ND	.007	ND	.033	ND	ND
CYCLOPROPYL BENZENE	ND	.320	ND	ND	ND	ND
# OF UNIDENTIFIED PEAKS	-	1	-	-	-	3

ALL SAMPLES WERE ANALYZED FOR ARSENIC, CADMIUM, MERCURY, LEAD, HEXAVALENT CHROMIUM, CYANIDE, CHLORIDE, COD AND VOLATILE ORGANIC CHEMICALS. THE VOLATILE ORGANICS LISTED ARE THOSE WHICH WERE DETECTED IN AT LEAST ONE OF THE WELLS.

* INDICATES CONTAMINATION ABOVE NJDEP ACTION/CLEANUP LEVELS.

TABLE 7
WATER SAMPLES
JULY 12, 1979

VOLATILE ORGANIC COMPOUNDS

	CONCENTRATION PPB (UG/L)	5 FEET UPSTREAM	WITHIN SITE JUST DOWNSTREAM OF MANUFACTURING AREAS	100 YARDS DOWNSTREAM OF SITE	250 YARI DOWNSTRI OF SITE
ACROLEIN	PPB	ND	ND	ND	ND
ACRYLONITRILE	PPB	ND	ND	ND	ND
BENZENE*	PPB	1.1	63.0	95.0	52.0
CARBONTETRACHLORIDE	PPB	ND	ND	ND	ND
CHLOROBENZENE*	PPB	0.9	1.9	2.1	1.1
1,1-DICHLOROETHANE*	PPB	0.7	3.2	5.1	3.3
1,2-DICHLOROETHANE*	PPB	2.2	2.9	2.5	1.3
1,1,1-TRICHLOROETHANE*	PPB	6.0	23.0	31.0	19.0
1,1,2-TRICHLOROETHANE	PPB	ND	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE*	PPB	ND	2.8	2.9	1.5

TABLE 7
WATER SAMPLES (cont.)
JULY 12, 1979

VOLATILE ORGANIC COMPOUNDS

	CONCENTRATION PPB (UG/L)	5 FEET UPSTREAM	WITHIN SITE JUST DOWNSTREAM OF MANUFACTURING AREAS	100 YARDS DOWNSTREAM OF SITE	250 YARD DOWNSTRE OF SITE
CHLOROETHANE	PPB	ND	ND	ND	ND
2-CHLOROETHYLVINYL ETHER	PPB	ND	ND	ND	ND
CHLOROFORM*	PPB	33.0	37.0	36.0	32.0
1,1-DICHLOROETHYLENE	PPB	ND	ND	ND	ND
1,2-TRANS-DICHLOROETHYLENE*	PPB	34.0	91.0	90.0	40.0
1,2-DICHLOROPROPANE	PPB	ND	ND	ND	ND
1,3-DICHLOROPROPENE	PPB	ND	ND	ND	ND
ETHYLBENZENE	PPB	0.9	7.8	11.0	5.3

* REPRESENTS AN INCREASE IN DOWNSTREAM SAMPLES AS COMPARED TO THE BACKGROUND (UPSTREAM) SAMPLE.

TABLE 7
WATER SAMPLES (cont.)
JULY 12, 1979

VOLATILE ORGANIC COMPOUNDS

	CONCENTRATION PPB (UG/L)	5 FEET UPSTREAM	WITHIN SITE JUST DOWNSTREAM OF MANUFACTURING AREAS	100 YARDS DOWNSTREAM OF SITE	250 YAR[D] DOWNSTR[EAM] OF SITE
METHYLENE CHLORIDE	PPB	6.2	4.2	4.8	7.4
METHYL CHLORIDE	PPB	ND	ND	ND	ND
METHYL BROMIDE	PPB	ND	ND	ND	ND
BROMOFORM	PPB	ND	ND	ND	ND
TRICHLOROFLUOROMETHANE	PPB	ND	ND	ND	ND
DICHLOROBROMOMETHANE	PPB	4.9	4.7	4.5	3.9
CHLORODIBROMOMETHANE	PPB	ND	ND	ND	ND
TETRACHLOROETHYLENE	PPB	44.0	27.0	39.0	21.0
TOLUENE*	PPB	1.2	22.0	24.0	11.0

TABLE 7
WATER SAMPLES (cont.)
JULY 12, 1979

VOLATILE ORGANIC COMPOUNDS

	CONCENTRATION PPB (UG/L)	5 FEET UPSTREAM	WITHIN SITE JUST DOWNSTREAM OF MANUFACTURING AREAS	100 YARDS DOWNSTREAM OF SITE	250 YARI DOWNSTRI OF SITE
TRICHLOROETHYLENE	PPB	74.0	69.0	68.0	32.0
VINYL CHLORIDE*	PPB	11.0	23.0	20.0	17.0
BIS (CHLOROMETHYL) ETHER	PPB	ND	ND	ND	ND
TOC	MG/L PPM	5.8	-	7.6	5.0

TABLE 7
WATER SAMPLES (cont.)
JULY 12, 1979

METALS (13)	SAMPLE CONC. UG/L (PPB)	100 FEET UPSTREAM OF SITE	5 FEET UPSTREAM OF SITE	WITHIN PLANT DOWNSTREAM OF WWTP	WITHIN PLANT 50 FEET BEFORE DOWNSTREAM SIDE OF PROPERTY	100 YARDS DOWNSTREAM OF PLANT	250 YARDS DOWNSTREAM OF PLANT	EASTERN DRAINAG DITCH 50 FT. STREAM SEPTIC LEACH F
ANTIMONY	-	-	-	-	-	-	-	-
ARSENIC	PPB	BDL	BDL	BDL	BDL	36	8J	1300
BERYLLIUM	PPB	BDL	BDL	2J	1J	BDL	BDL	1J
CADMIUM	PPB	3J	3J	4J	2J	2J	3J	6J
CHROMIUM	PPB	31	26	23	24	22	10J	20J
COPPER	PPB	97	76	70	63	45	28	60
LEAD	PPB	BDL	BDL	BDL	BDL	BDL	BDL	170
MERCURY (WATER)	PPB	BDL	55	21	26	84	71	886
NICKEL	PPB	BDL	BDL	BDL	BDL	BDL	BDL	405
SELENIUM	PPB	BDL	BDL	BDL	BDL	BDL	BDL	BDL
SILVER	PPB	24	BDL	14	13	8J	BDL	BDL
THALLIUM	PPB	BDL	BDL	BDL	BDL	BDL	BDL	BDL
ZINC	PPB	100J	100J	100J	100J	50J	50J	270

MERCURY (SEDIMENT)*	MG/KG PPM	140	191	22400	11600	3120	244	83200
TOC	MG/L PPM	4.5	5.8	3.6	5.4	7.6	5.0	78.5

BDL - BELOW DETECTION LIMIT
J - ESTIMATED VALUE

TABLE 8

NOVEMBER 17, 1989

(all results in ppb unless otherwise indicated)

	SED-1	SED-2	SED-3	SED-4
vinyl chloride			29,000	4
methylene chloride			37,000	
1,1-dichloroethene		1,900		
1,1-dichloroethane	21	36,000	240,000	11
1,2-dichloroethene	7	2,300	1,300,000	22
chloroform			190,000	9
2-butanone			250,000	
1,1,1-trichloroethane		1,400,000	3,100,000	41
trichloroethene		61,000	430,000	
Benzene	40	43,000	1,200,000	45
4-methyl-2-pentanone		5,200		29
tetrachloroethene	7	2,300,000	2,100,000	46
chlorobenzene		4,100	31,000	10
2-methylphenol			56,000	
2,4-dimethylphenol			89,000	
naphthalene		5,500	31,000	
2-methylnapthalene		17,000	190,000	
bis(2-ethylhexyl)phthalate	26,000	160,000		
Arsenic (ppm)	70.2	115	167	71.7
Copper (ppm)	188	1,090	1,040	694
Lead (ppm)	1,880	5,270	25,200	2,460
Mercury (ppm)	690	4,500	607,000	1,790
PHC's	21,000,000	38,000,000	31,000,000	83,000,000

TABLE 9

NOVEMBER 17, 1989

(all results in ppb unless otherwise indicated)

	SED-5	SED-6	SED-7
methylene chloride		35,000	9
acetone		120,000	
2-butanone		110,000	
xylene	21	130,000	7
benzene		300,000	55
toluene		37,000	
1,4-dichlorobenzene			1,700
1,2-dichlorobenzene			3,600
nitrobenzene			7,500
1,2,4-trichlorobenzene			10,000
2-methylnaphthalene		67,000	35,000
diethylphthalate		1,700	
fluorene		7,100	2,200
phenanthrene	760	24,000	11,000
anthracene	100	13,000	11,000
di-n-butylphthalate	140	24,000	
fluoranthene	1,200	11,000	14,000
pyrene	710	5,900	9,300
butylbenzylphthalate		62,000	
chrysene	460	3,000	4,800
bis(2-ethylhexyl)phthalate	340	340,000	420,000
di-n-octylphthalate		21,000	21,000
4,4'-DDD	840	180,000	
4,4'-DDT	340	66,000	
Aroclor-1242			650,000
Arsenic (ppm)	20.1	1,390	1,980
Barium (ppm)		7,960	766
Cadmium (ppm)		74.5	77.2
Chromium (ppm)		254	419
Copper (ppm)		1,200	1,680
Lead (ppm)	175	13,400	5,150
Mercury (ppm)	210	9,641	2,270
PHC's	260,000	270,000	14,000,000

TABLE 10

	CONCENTRATION	NEAR DUMPSTER	SOUTH OF FUNGICIDE PLANT	DRUM STORAGE SOUTH OF WAREHOUSE	DRUM STORAGE "YARD AREA"	NJDEP AC CLEANUP LEVEL
COPPER	MG/KG PPM	899.12*	361.84*	3289.47*	67.98	170
LEAD	MG/KG PPM	110.0	500.0*	105.0	90.0	250-1000
ARSENIC	MG/KG PPM	ND	3.361	2.185	0.798	20
ZINC	MG/KG PPM	3950.73*	1195.75*	2447.22*	51.19	350
MERCURY	MG/KG PPM	>60*	>60*	>60*	>60*	1
p,p-DDT	UG/KG PPB	32.76		ND		1,000-10,000
p,p-DDD	UG/KG PPB	32.86		ND		1,000-10,000
o,p-DDT	UG/KG PPB	25.0		ND		1,000-10,000

932250201

TABLE 10 (cont.)

	CONCENTRATION	NEAR DUMPSTER	SOUTH OF FUNGICIDE PLANT	DRUM STORAGE SOUTH OF WAREHOUSE	DRUM STORAGE "YARD AREA"	BEECRA CLEANUP LEVEL
pp DDE	UG/KG PPB	8.3		ND		NO CLEAN LEVELS AVAILABI
TRICHLOROETHANE	UG/KG PPB	3900*		ND	ND	1000 ppb TOTAL VO
OCTANE	UG/KG PPB	4250*		900	ND	1000 pp TOTAL VO
BENZENE	UG/KG PPB	1900*		1300*	ND	1000 ppb TOTAL VO
MIBK	UG/KG PPB	>50000*		26000*	ND	1000 ppb TOTAL VO

* INDICATES CONCENTRATIONS ABOVE THE NJDEP RECOMMENDED ACTION/CLEANUP GUIDELINES.

TABLE II

932250203

SITE:
LOCATION:

PAGE 1

SUMMARY OF SAMPLING DATA
VOLATILES

DATE SAMPLED 11-1[illegible]-88
SAMPLE NO.
MATRIX
UNITS ppb

	[illegible]	SW 3	SW 4	[illegible]	MW-1		[illegible]	[illegible]	Sed 3	[illegible]	Sed 6	Sed 7
Chloromethane												
Bromomethane												
Vinyl Chloride		5 J	3 J			J			[illegible] J	4 J		
Chloroethane		3 J	2 J		[illegible]					2 J		
Methylene Chloride				460					[illegible]		35000 J	7 J
Acetone											[illegible]	
Carbon Disulfide		2 J	1 J		2 J					2 J		
1,1-Dichloroethene		1 J						1700 J				
1,1-Dichloroethane	2 J	23	7		1 J	1 J	21	36,[illegible]	[illegible]	11		4 J
1,2-Dichloroethene	3 J	12	11				7	2,300	1.3×10^6	22		14
Chloroform	4 J	21	18						1.9×10^5	9 J		
1,2-Dichloroethane												[illegible]
2-Butanone									2.5×10^5		[illegible]	
1,1,1-Trichloroethane	16	210	26					1.1×10^6	[illegible]	41		[illegible]
Carbon Tetrachloride												
Xylenes		6	12		11	23	21			[illegible]	[illegible]	7 J

TABLE 11

932250204

SITE:
LOCATION:

SUMMARY OF SAMPLING DATA
VOLATILES

Troy

DATE SAMPLED 11-17-88
SAMPLE NO.
MATRIX
UNITS ppb

	11	[illegible]	[illegible]	
Chloromethane				
Bromomethane				
Vinyl Chloride				
Chloroethane				
Methylene Chloride	[illegible] B	320 J		
Acetone	3[illegible]B	2400		
Carbon Disulfide			4	
1,1-Dichloroethene				
1,1-Dichloroethane			[illegible] J	
1,2-Dichloroethene			[illegible] J	
Chloroform				
1,2-Dichloroethane				
2-Butanone	5000 B	61[illegible]	[illegible]	
1,1,1-Trichloroethane			21	
Carbon Tetrachloride				
Xylenes	[illegible]	[illegible]		

TABLE 11

SUMMARY OF SAMPLING DATA
VOLATILES (CONT.)

Troy

DATE SAMPLED 11-17-88
SAMPLE NO.
MATRIX
UNITS ppb

	SW-1	[illegible] 2	[illegible] 3	SW-4	MW-1	[illegible]	[illegible] 1	[illegible] 2	[illegible] 3	[illegible] 4	[illegible]	[illegible]
Vinyl Acetate												
Bromodichloromethane												
1,1,2,2-Tetrachloroethane												
1,2-Dichloropropane												9J
trans-1,3-Dichloropropene												
Trichloroethene		2J	100					6,000 J	4.5×10^5	9J		30
Dibromochloromethane												
1,1,2-Trichloroethane												
Benzene	10	1J	70	42	2000	[illegible]	7	43,000J	1.2 x 10^6	45	[illegible]	[illegible]
cis-1,3-Dichloropropene												
Bromoform												
4-Methyl-2-Pentanone			4	5J	13			5000 J		29		
2-Hexanone												
Tetrachloroethene		11	60	16			1	2.3x10^6	[illegible]	46		18
Toluene		1J	22	[illegible]	7	12				[illegible]	[illegible]	
Chlorobenzene			13	[illegible]		2J		4100	[illegible]	10		
Ethylbenzene										[illegible]		20
[illegible]	[illegible]			[illegible]	5		[illegible]	[illegible]	[illegible]	[illegible]		[illegible]

TABLE II

SUMMARY OF SAMPLING DATA
VOLATILES (CONT.)

Troy

DATE SAMPLED 11-17-98
SAMPLE NO.
MATRIX
UNITS ppb

	[illegible]	[illegible]	[illegible]	[illegible]
Vinyl Acetate				
Bromodichloromethane				
1,1,2,2-Tetrachloroethane				11
1,2-Dichloropropane				
trans-1,3-Dichloropropene				
Trichloroethene				4
Dibromochloromethane				
1,1,2-Trichloroethane				
Benzene			1 J	7
cis-1,3-Dichloropropene				
Bromoform				
4-Methyl-2-Pentanone				
2-Hexanone				
Tetrachloroethene		[illegible]	15	21
Toluene	[illegible]	[illegible]	[illegible]	
Chlorobenzene				
Ethylbenzene	5400 B	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE 11

932250207

SUMMARY OF SAMPLING DATA
SEMI-VOLATILE COMPOUNDS

PAGE 5

Troy

DATE SAMPLED 11-17-88
SAMPLE NO.
MATRIX
UNITS ppb

	[illegible]	[illegible]
Phenol		
bis(2-Chloroethyl) ether		
2-Chlorophenol		
1,3-Dichlorobenzene		
1,4-Dichlorobenzene		1700
Benzyl alcohol		
1,2-Dichlorobenzene		3600
2-Methylphenol	56,000	
bis(2-Chloroisopropyl) ether		
4-Methylphenol		
N-Nitroso-di-n-propylamine		
Hexachloroethane		
Nitrobenzene		7500J
Isophorone		
2-Nitrophenol		
2,4-Dimethylphenol	89,000	
Benzoic acid		

SUMMARY OF SAMPLING DATA
SEMI-VOLATILE COMPOUNDS (CONT.)

DATE SAMPLED 11-17-88
SAMPLE NO.
MATRIX
UNITS ppb

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	S-7	S-12	S-15	S-55
bis (2-Chloroethoxy) methane										
2,4-Dichlorophenol										
1,2,4-Trichlorobenzene							17,000J			
Naphthalene		12	[illegible]	[illegible]	13J			640J	25,000	620J
4-Chloroaniline										
Hexachlorobutadiene										
4-Chloro-3-methylphenol										
2-Methylnaphthalene	15		1700J	17,000		67,000	[illegible]	47,000	320,000	1100J
Hexachlorocyclopentadiene										
2,4,6-Trichlorophenol										
2,4,5-Trichlorophenol										
2-Chloronaphthalene										
2-Nitroaniline										
Dimethylphthalate										
Acenaphthylene										
2,6-Dinitrotoluene										

TABLE II

SUMMARY OF SAMPLING DATA
SEMI-VOLATILE COMPOUNDS (CONT.)

DATE SAMPLED 11-17-88
SAMPLE NO.
MATRIX
UNITS ppb

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
3-Nitroaniline									
Acenaphthylene								[illegible]	
2,4-Dinitrophenol									
4-Nitrophenol									
Dibenzofuran		[illegible]							
2,4-Nitrotoluene									
Diethylphthalate		[illegible]		[illegible]			[illegible]		
4-Chlorophenyl-phenylether									
Fluorene	[illegible]	[illegible]		[illegible]	[illegible]			44J	
4-Nitroaniline									
4,6-Dinitro-2-methylphenol									
N-Nitrosodiphenylamine									
4-Bromophenyl-phenylether									
Hexachlorobenzene									
Pentachlorophenol									
Phenanthrene		4600J	[illegible]	[illegible]	[illegible]	2400J	[illegible]	[illegible]	
Anthracene			[illegible]	13,000J	[illegible]			[illegible]	

TABLE II

932250210

SUMMARY OF SAMPLING DATA
SEMI-VOLATILE COMPOUNDS (CONT.)

PAGE 8 0

Troy

DATE SAMPLED 11-17-88
SAMPLE NO.
MATRIX
UNITS ppb

	[illegible]		Soil-2	[illegible]	Soil-4	Soil 5	Sed-1	Sed-3	Sed-4	Sed-5	Sed-6	Sed-7
Di-n-butylphthalate			[illegible]		2J					110J	24,000J	
Fluoranthene					6J		500J			1,200	11,000	14,000J
Pyrene				4J	5J		3600J			110	5,900	9,300J
Butylbenzylphthalate				3J				1300J			62,000	
3,3-Dichlorobenzidine												
Benzo (a) anthracene					1J					330J		
Chrysene					2J					490	3,000	4,800J
bis(2-Ethylhexyl) phthalate	38	62	24	29	[illegible]	28	26,000J	160,000	120,000	310J	310,000	420,000
Di-n-octylphthalate	[illegible]			2J	1J						26,000	21,000
Benzo (b) fluoranthene				2J	2J					590		
Benzo (k) fluoranthene										440J		
Benzo (a) pyrene					1J					250J		
Indeno (1,2,3-cd) pyrene										270J		
Dibenz (a,h) anthracene												
Benzo (g,h,i) perylene										[illegible]		
TIC (total)	6207J	[illegible]	557J	1179	[illegible]	26,499	1,186,100	1.1×10^7J	[illegible]$\times10^6$	[illegible]	[illegible]	[illegible]$\times10^6$
diphenyl mercury								12×10^7J				

TABLE II

932250211

SUMMARY OF SAMPLING DATA
SEMI-VOLATILE COMPOUNDS (CONT.)

DATE SAMPLED 11-17-88
SAMPLE NO.
MATRIX
UNITS ppb

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Di-n-butylphthalate				[illegible]		
Fluoranthene			14[illegible]	2100	[illegible]J	[illegible]J
Pyrene			[illegible]J	940	[illegible]	1700J
Butylbenzylphthalate						
3,3-Dichlorobenzidine						
Benzo (a) anthracene				[illegible]		
Chrysene				[illegible]		
bis(2-Ethylhexyl) phthalate					[illegible]	
Di-n-octylphthalate					[illegible]	
Benzo (b) fluoranthene				530		
Benzo (k) fluoranthene				510		
Benzo (a) pyrene				450		
Indeno (1,2,3-cd) pyrene				260J		
Dibenz (a,h) anthracene				34J		
Benzo (g,h,i) perylene				[illegible]		
[illegible]	15x10[illegible]	[illegible]	[illegible]	[illegible]	21,900	2,198,000

TABLE II

932250212

SUMMARY OF SAMPLING DATA
PESTICIDES AND PCBs

Troy

DATE SAMPLED 11-17-88
SAMPLE NO.
MATRIX
UNITS [illegible]

	Sed-1	Sed-5	[illegible]	[illegible]	[illegible]
alpha-BHC					
beta-BHC					
delta-BHC					
gamma-BHC					
Heptachlor					
Aldrin					[illegible]
Heptachlor epoxide					
Endosulfan I					
Dieldrin					
4,4' -DDE		[illegible]		30 [illegible]	
Endrin					
Endosulfan II					
4,4' -DDD	[illegible]	8400	[illegible]		
Endosulfan sulfate					
4,4' -DDT		3400	[illegible]	15JD	
Methoxychlor					
Endrin ketone					

TABLE 11

SUMMARY OF SAMPLING DATA
PESTICIDES AND PCBs (CONT.)

Troy

DATE SAMPLED 11-17-88
SAMPLE NO.
MATRIX
UNITS ppb

	Sed-7
alpha-Chlordane	
gamma-Chlordane	
Toxaphene	
Aroclor-1016	
Aroclor-1221	
Aroclor-1232	
Aroclor-1242	650,000 D
Aroclor-1248	
Aroclor-1254	
Aroclor-1260	

932250214

TABLE 11

Troy

SUMMARY OF SAMPLING DATA
METALS

PAGE 12

DATE SAMPLED 11-17-88
SAMPLE NO.
MATRIX
UNITS

	ppb							ppm						
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] 3	[illegible] 4	[illegible] 5	[illegible] 1	[illegible] 2	[illegible]	[illegible] 4	[illegible] 5	[illegible] 6	[illegible]
Aluminum														
Antimony								[illegible]						
Arsenic								[illegible]	115	[illegible]	71.7	20.1	[illegible]	[illegible]
Barium									[illegible]				7900	[illegible]
Beryllium														
Cadmium	[illegible]							[illegible]	[illegible]	[illegible]	[illegible]		115	[illegible]
Calcium														
Chromium	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]	121		[illegible]	[illegible]
Cobalt														
Copper								[illegible]	[illegible]	540	674		[illegible]	[illegible]
Iron														
Lead	114	515	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5270	25,200	2460	[illegible]	[illegible]	[illegible]
Magnesium														
Manganese														
Mercury		4.96	10.8	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Nickel														
Potassium														

TABLE 11

932250215

PAGE 13

SUMMARY OF SAMPLING DATA
METALS (CONT.)

DATE SAMPLED 11-17-88
SAMPLE NO.
MATRIX
UNITS

	ppb							ppm						
	SW-1	SW-2	SW-3	SW-4	SW-5	MW-1	MW-2	Sed-1	Sed-2	Sed-3	Sed-4	Sed-5	Sed-6	Sed-7
Selenium														
Silver													162	
Sodium														
Thallium														
Vanadium											192			
Zinc								4110		416	[illegible]		1920	3050
Cyanide								13			[illegible]			63
Other PHC's ppb	5,000	1,400	7,100	1,400	28,000	7,600		2.1×10^7	3.8×10^7	3.1×10^7	8.3×10^7	2.6×10^5	2.7×10^5	1.4×10^7

TABLE 11

SUMMARY OF SAMPLING DATA
METALS

Troy

DATE SAMPLED 11-17-88
SAMPLE NO.
MATRIX
UNITS [illegible]

	S-1D	[illegible]		[illegible]	[illegible]	[illegible]
Aluminum						
Antimony						
Arsenic						55.7
Barium		[illegible]			[illegible]	[illegible]
Beryllium	8.4	[illegible]				
Cadmium						[illegible]
Calcium						
Chromium	151	[illegible]				
Cobalt						
Copper		4010			174	[illegible]
Iron						
Lead	[illegible]	[illegible]	[illegible]	246	3920	[illegible]
Magnesium						
Manganese						
Mercury	910	2810	[illegible]	[illegible]	[illegible]	[illegible]
Nickel	503	1860				
Potassium						

G7

NJ-CORP -
Information current through 04/30/1998
Update Frequency:As Current As SoS
Source:Secretary of State

Name:TROY INTERNATIONAL CORP. (DE)

Agent Name:CORPORATION SERVICE COMPANY
Title:Registered Agent
Address:830 BEAR TAVERN ROAD
WEST TRENTON NJ 08628
Status:AGENT CHANGED
Date of Appointment:04/27/95

Type:FOREIGN/DBA
State of Origin DELAWARE
Date of Filing:01/07/1992
Status:REVOKED (OVER 2 YEARS)
Suspension Date:07/08/95
State ID Number:0100504925

Annual Report Due Date:01/00
Lst Yr Ann Rpt Filed:00

END OF DOCUMENT

BBJ000005

NJ-CORP -
Annual Report Due Date:01/00
1st Yr Ann Rpt Filed:00

END OF DOCUMENT

G8

NJ-CORP -
Information current through 04/30/1998
Update Frequency:As Current As SoS
Source:Secretary of State

Name:TROY CORPORATION
Address:72 EAGLE ROCK AVE
EAST HANOVER NJ 07936

Mailing Address:72 EAGLE ROCK AVE
EAST HANOVER NJ 07936

Agent Name:CORPORATION SERVICE COMPANY
Title:Registered Agent
Address:830 BEAR TAVERN ROAD
WEST TRENTON NJ 08628
Status:AGENT CHANGED
Date of Appointment:04/27/95

Type:FOREIGN

State of Origin DELAWARE
Date of Filing:01/08/1992
Status:REVOKED (UNDER 2 YEARS)
Suspension Date:12/01/95
Annual Report Date:12/12/95
State ID Number:0100504981
Annual Report Due Date:01/96

BBJ000007

NJ-CORP -
State of Origin DELAWARE
Date of Filing:01/08/1992
Status:REVOKED (UNDER 2 YEARS)
Suspension Date:12/01/95
Annual Report Date:12/12/95
State ID Number:0100504981
Annual Report Due Date:01/96
Lst Yr Ann Rpt Filed:96

END OF DOCUMENT

G9

932250223

COLLATERAL: Leased Equipment
FILING NO: 1733889 DATE FILED: 11/15/1996
TYPE: Original LATEST INFO RECEIVED: 12/30/1996
SEC. PARTY: ASSOCIATES LEASING, INC., IRVING TX FILED WITH: SECRETARY OF STATE UCC DIVISION, NJ
DEBTOR: TROY CHEMICAL CORPORATION

The public record items contained in this report may have been paid, terminated, vacated or released prior to the date this report was printed.

HISTORY
12/08/97

WILLIAM RUDLOF, V PRES OF OPERATIONS-GEN MGR-CEO
DAVID DE MUTH, VICE PRESIDENT-FINANCE-CHIEF FINANCIAL OFFICER
DIRECTOR(S): THE OFFICER(S)

BUSINESS TYPE: Corporation - Profit
DATE INCORPORATED: 08/10/1956
STATE OF INCORP: New Jersey

AUTH SHARES-COMMON: 12,000
PAR VALUE-COMMON: No Par Value

The corporation purchased the assets and assumed the liabilities of the predecessor company.

Business started 1952 by Elias Singer and another, trading as Troy Chemical Co. Present control succeeded Dec 1991. 100% of capital stock is owned by the parent company.

Effective Dec 1991 Troy Corporation was formed as a newly created parent company for all of the outstanding capital stock of Troy Chemical Corp. **The officers of Troy Chemical Corp exchanged their stock for all of the outstanding capital stock of Troy Corporation. There was no monetary consideration involved.**

WILLIAM RUDLOF. OCCUPATIONAL BACKGROUND: 1963 graduated Fairleigh Dickinson University with a BS degree in Business Administration, 1971 with an MBA degree. 1963-1968 Howe Richardson Scale Co, Clifton, NJ in project cost accounting. 1968-1970-Butoni Foods Corp, So Hackensack, NJ as assistant cost accounting manager. 1970-1971 Butler International as base accounting manager. 1971-1974 Woodridge Chemical Div, Ventron Corp, Wood Ridge, NJ as plant controller. **1974-present active with Troy Chemical Corp.**

DAVID DE MUTH born 1945. EDUCATION: 1967 graduated from Loyola College with a BS in accounting. 1991 graduated from La Salle University with a MBA in finance. OCCUPATIONAL BACKGROUND: 1986-1990 employed with National Starch and Chemical Company, Bridgewater, NJ. 1990-1996 employed by Continental Grain Company, New York, NY 1996 to present active with parent.

AFFILIATE: The following is a **sister subsidiary:**

Troy International Corp, East Hanover, NJ, started 1991. DUNS number 07-117-7369. Operates as a wholesaler and exporter of paint adhesives. Intercompany relations: Undetermined.

OPERATION
12/08/97

Subsidiary of Troy Corporation, Florham Park, NJ started 1991 which operates as a holding company. Parent company owns 100% of capital stock. Parent company has one other subsidiary(ies). **Intercompany relations:** Reported by management to consist of service transactions.

As noted, this company is a subsidiary of **Troy Corporation,** DUNS **number 79-120-0959,** and reference is made to that report for background information on the parent company and its management.

BBJ000009

932250224

G10

DnB Report
Oct 15, 2004

BBJ000010

D&B Business Information Report

ATTN: **ivieterry@andrewskurth.com**

Report Printed: OCT 15 2004
In Date

BUSINESS SUMMARY

TROY CHEMICAL CORP
(SUBSIDIARY OF TROY CORPORATION, FLORHAM PARK, NJ)
One Avenue L
Newark, NJ 07105

This is a **single (subsidiary)** location.

Telephone:	973 589-2500
Fax:	973 817-9383
Chief executive:	WILLIAM RUDLOF, V PRES-GEN MGR
Year started:	1952
Management control:	1991
Employs:	234
History:	CLEAR
Financing:	SEC-UNSEC
SIC:	2851 2893 2879 2869
Line of business:	Mfg. specialty chemicals

D-U-N-S Number:	00-214-4517
D&B Rating:	**1R3**
Number of employees:	1R is **10 or more** employees.
Composite credit appraisal:	3 is **fair.**

D&B PAYDEX®:

12-Month D&B PAYDEX: 65
When weighted by dollar amount, payments to suppliers average 19 days beyond terms.

Based on trade collected over last 12 months.

SUMMARY ANALYSIS

D&B Rating: **1R3**
Number of employees: 1R indicates **10 or more** employees.
Composite credit appraisal: 3 is **fair.**

The 1R and 2R ratings categories reflect company size based on the total number of employees for the business. They are assigned to business files that do not contain a current financial statement. In 1R and 2R Ratings, the 2, 3, or 4 creditworthiness indicator is based on analysis by D&B of public filings, trade payments, business age and other important factors. 2 is the highest Composite Credit Appraisal a company not supplying D&B with current financial information can receive. For more information, see the D&B Rating Key.

Below is an overview of the company's rating history since 08/27/92:

D&B Rating	Date Applied
1R3	12/04/01
--	08/27/92

The Summary Analysis section reflects information in D&B's file as of October 11, 2004.

CUSTOMER SERVICE

If you have questions about this report, please call our Customer Resource Center at 1.800.234.3867 from anywhere within the U.S. If you are outside the U.S. contact your local D&B office.

*** Additional Decision Support Available ***

Additional D&B products, monitoring services and specialized investigations are available to help you evaluate this company or its industry. Call Dun & Bradstreet's Customer Resource Center at 1.800.234.3867 from anywhere within the U.S. or visit our website at www.dnb.com.

HISTORY

The following information was reported **10/17/2003**:

Officer(s): WILLIAM RUDLOF, V PRES OF OPERATIONS-GEN MGR-CEO

DIRECTOR(S): THE OFFICER(S)

The corporation purchased the assets and assumed the liabilities of the predecessor company.

Business started 1952 by Elias Singer and another, trading as Troy Chemical Co. Present control succeeded Dec 1991. 100% of capital stock is owned by the parent company.

Effective Dec 1991 Troy Corporation was formed as a newly created parent company for all of the outstanding capital stock of Troy Chemical Corp. The officers of Troy Chemical Corp exchanged their stock for all of the outstanding capital stock of Troy Corporation. There was no monetary consideration involved.

WILLIAM RUDLOF. OCCUPATIONAL BACKGROUND: 1963 graduated Fairleigh Dickinson University with a BS degree in Business Administration, 1971 with an MBA degree. 1963-1968 Howe Richardson Scale Co, Clifton, NJ in project cost accounting. 1968-1970 Butoni Foods Corp, So Hackensack, NJ as assistant cost accounting manager. 1970-1971 Butler International as base accounting manager. 1971-1974 Woodridge Chemical Div, Ventron Corp, Wood Ridge, NJ as plant controller. 1974-present active with Troy Chemical Corp.

AFFILIATE:
The following is a sister subsidiary:

Troy International Corp, East Hanover, NJ, started 1991. DUNS number 07-117-7869. Operates as a wholesaler and exporter of paint adhesives. Intercompany relations: Undetermined.

CORPORATE FAMILY

Click below to buy a Business Information Report on that family member.
For an expanded, more current corporate family view, use D&B's Global Family Linkage product.

Parent:

Troy Corporation	Florham Park, NJ	DUNS # 79-120-0959

Affiliates (US): *(Affiliated companies share the same parent company as this business.)*

Fti Inc	Florham Park, NJ	DUNS # 14-499-6527
Troy International Corp	Florham Park, NJ	DUNS # 07-117-7869

BUSINESS REGISTRATION

CORPORATE AND BUSINESS REGISTRATIONS PROVIDED BY MANAGEMENT OR OTHER SOURCE

The Corporate Details provided below may have been submitted by the management of the subject business and may not have been verified with the government agency which records such data.

Registered Name: TROY CHEMICAL CORP

Business type:	CORPORATION	**Common stock**	
Corporation type:	PROFIT	Authorized shares:	12,000
Date incorporated:	AUG 10 1956	Par value:	NO PAR VALUE
State of incorporation:	NEW JERSEY		

Where filed: DEPT OF STATE/DIVISION OF COMMERICAL RECORDINGS, TRENTON, NJ

OPERATIONS

10/17/2003

Description: Subsidiary of Troy Corporation, Florham Park, NJ started 1991 which operates as a holding company. Parent company owns 100% of capital stock. Parent company has one other subsidiary(ies). Intercompany relations: Reported by management to consist of service transactions.

As noted, this company is a subsidiary of Troy Corporation, DUNS number 79-120-0959, and reference is made to that report for background information on the parent company and its management.

Financial information on the parent company is unavailable.

Manufactures specialty chemicals, primarily industrial biocides for paints, printing inks and pesticides.

Terms are net 30 days. Has 1,000 account(s). Sells to manufacturers.

Nonseasonal.

Employees: 234 which includes officer(s).

Facilities: Owns 6,000 sq. ft. in a one story frame building.

Location: Industrial section on well traveled street.

SIC & NAICS

SIC:

Based on information in our file, D&B has assigned this company an extended 8-digit SIC. D&B's use of 8-digit SICs enables us to be more specific to a company's operations than if we use the standard 4-digit code.

The 4-digit SIC numbers link to the description on the Occupational Safety & Health Administration (OSHA) Web site. Links open in a new browser window.

28510000	Paints and allied products
28930000	Printing ink
28790107	Pesticides, agricultural or household
28690000	Industrial organic chemicals, nec

NAICS:

325510	Paint and Coating Manufacturing
325910	Printing Ink Manufacturing
325320	Pesticide and Other Agricultural Chemical Manufacturing
325199	All Other Basic Organic Chemical Manufacturing

D&B PAYDEX

The D&B PAYDEX is a unique, dollar weighted indicator of payment performance based on up to 46 payment experiences as reported to D&B by trade references.

3-Month D&B PAYDEX: 65
When weighted by dollar amount, payments to suppliers average 19 days beyond terms.

12-Month D&B PAYDEX: 65
When weighted by dollar amount, payments to suppliers average 19 days beyond terms.

Based on trade collected over last 3 months.

Based on trade collected over last 12 months.

When dollar amounts are not considered, then approximately 75% of the company's payments are within terms.

PAYMENT SUMMARY

The Payment Summary section reflects payment information in D&B's file as of the date of this report.

Below is an overview of the company's dollar-weighted payments, segmented by its suppliers' primary industries:

	Total Rcv'd (#)	Total Dollar Amts ($)	Largest High Credit ($)	Within Terms (%)	Days Slow <31 (%)	31-60	61-90	90>
Top industries:								
Nonclassified	11	111,750	100,000	54	46	-	-	-
Trucking non-local	4	11,750	10,000	11	85	-	-	4
Arrange cargo transpt	4	6,300	5,000	9	51	40	-	-
Mfg organic chemicals	3	980,000	500,000	50	50	-	-	-
Mfg inorganic chemcls	2	80,000	65,000	19	81	-	-	-
Misc equipment rental	1	20,000	20,000	-	100	-	-	-
Whol hardware	1	5,000	5,000	100	-	-	-	-
Whol electrical equip	1	2,500	2,500	100	-	-	-	-
Whol motor vehicles	1	2,500	2,500	-	100	-	-	-
Mfg industrial gases	1	2,500	2,500	100	-	-	-	-
OTHER INDUSTRIES	15	13,500	2,500	59	37	4	-	-
Other payment categories:								
Cash experiences	1	0	0					
Payment record unknown	1	500	500					
Unfavorable comments	0	0	0					
Placed for collections:								
With D&B	0	0						
Other	0	N/A						
Total in D&B's file	46	1,236,300	500,000					

The highest **Now Owes** on file is $500,000

The highest **Past Due** on file is $100,000

D&B receives nearly 400 million payment experiences each year. We enter these new and updated experiences into D&B Reports as this information is received.

PAYMENT DETAILS

Detailed payment history

Date Reported (mm/yy)	Paying Record	High Credit ($)	Now Owes ($)	Past Due ($)	Selling Terms	Last Sale Within (months)
09/04	Ppt	15,000	15,000	0		1 mo

	Ppt	2,500	1,000	0	N30	1 mo
	Ppt	1,000	50	0		1 mo
	Ppt	1,000	0	0		6-12 mos
	Ppt	1,000	100	0		1 mo
	Ppt	750	250	0		1 mo
	Ppt	500	0	0		2-3 mos
	Ppt	500	0	0		6-12 mos
	Ppt	250	0	0	N30	6-12 mos
	Ppt	100	0	0		2-3 mos
	Ppt	100	0	0		2-3 mos
	Ppt-Slow 30	500,000	500,000	100,000		1 mo
	Ppt-Slow 30	100,000	60,000	0		1 mo
	Ppt-Slow 30	2,500	1,000	1,000		1 mo
	Ppt-Slow 30	750	0	0		6-12 mos
	Ppt-Slow 30	50	50	0		1 mo
	Ppt-Slow 240	1,000	100	0		1 mo
	Slow 5	500	0	0		6-12 mos
	Slow 15	500	500	500		1 mo
	Slow 30	20,000	0	0		1 mo
	Slow 30	2,500	2,500	1,000	N30	1 mo
08/04	Ppt	250	0	0		4-5 mos
	Slow 30	750	500	500	N10	1 mo
07/04	Ppt	7,500	7,500	0		1 mo
	Ppt	250	100	0		1 mo
	Slow 30	2,500	0	0	N30	2-3 mos
	Slow 30-60	5,000	2,500	2,500	N30	1 mo
	(028)	0	0	0	Cash account	1 mo
06/04	Disc-Ppt	5,000	2,500	0		1 mo
	Ppt	2,500	0	0		2-3 mos
05/04	Ppt	500	0	0		6-12 mos
	Ppt	250	0	0		6-12 mos
	Slow 30	10,000	1,000	750		1 mo
04/04	Ppt	250	0	0	N30	6-12 mos
	Ppt	50	0	0		6-12 mos
	Slow 10	65,000	10,000	0		1 mo
	Slow 30	750	750	750		1 mo
03/04	Ppt	750	100	0		1 mo
02/04	Ppt-Slow 30	400,000	0	0		6-12 mos
	Ppt-Slow 30	80,000	80,000	40,000		1 mo
11/03	Ppt	1,000	0	0		6-12 mos
10/03	(042)	750				1 mo
	Satisfactory.					
09/03	Ppt	750	0	0		6-12 mos
08/03	Ppt	1,000	0	0		1 mo
07/03	Slow 60	500	0	0		6-12 mos
06/03	(046)	500	500	0	N30	1 mo

Payments Detail Key: red = 30 or more days beyond terms

Payment experiences reflect how bills are met in relation to the terms granted. In some instances payment beyond terms can be the result of disputes over merchandise, skipped invoices etc.

Each experience shown is from a separate supplier. Updated trade experiences replace those previously reported.

FINANCE

10/17/2003

On OCT 17 2003 John Vitolo, Controller, declined financial information.

BANKING

First National Bank of Boston, Boston, MA

PUBLIC FILINGS

The following Public Filing data is for information purposes only and is not the official record. Certified copies can only be obtained from the official source.

SUITS

Status:	**Pending**
DOCKET NO.:	007501-00
Plaintiff:	KARL WEBB
Defendant:	TROY CHEMICAL COMPANY
Where filed:	MIDDLESEX COUNTY SUPERIOR COURT, NEW BRUNSWICK, NJ
Date status attained:	09/08/2000
Date filed:	09/08/2000
Latest Info Received:	12/18/2000

If it is indicated that there are defendants other than the report subject, the lawsuit may be an action to clear title to property and does not necessarily imply a claim for money against the subject.

UCC FILINGS

Collateral:	Leased Equipment including proceeds and products
Type:	Original
Sec. party:	NMHG FINANCIAL SERVICES INC., DANBURY, CT
Debtor:	TROY CHEMICAL CORPORATION
Filing number:	2030889
Filed with:	SECRETARY OF STATE/UCC DIVISION, TRENTON, NJ
Date filed:	03/21/2001
Latest Info Received:	04/17/2001

Type:	Amendment
Sec. party:	YALE FINANCIAL SERVICES, INC,., FLEMINGTON, NJ
Debtor:	TROY CHEMICAL CORPORATION, INC.
Filing number:	1691417
Filed with:	SECRETARY OF STATE/UCC DIVISION, TRENTON, NJ
Date filed:	02/07/2001
Latest Info Received:	03/23/2001
Original UCC filed date:	04/08/1996
Original filing no.:	1691417

The public record items contained in this report may have been paid, terminated, vacated or released prior to the date this report was printed.

GOVERNMENT ACTIVITY

Activity summary

Borrower (Dir/Guar):	NO
Administrative debt:	NO
Contractor:	NO
Grantee:	NO
Party excluded from federal program(s):	NO

Possible candidate for socio-economic program consideration

Labor surplus area:	YES (2003)
Small Business:	N/A
8(A) firm:	N/A

The details provided in the Government Activity section are as reported to Dun & Bradstreet by the federal government and other sources.

G11

*START*START*START*START*START*START*START*START*START*START*START*START*START*START*

939529 - MCRAE,JANIS

Number of Requests in Group:	1	
Approximate Number of Lines:	35	
Date and Time Printing Started:	05/08/98	12:29:39 pm (Central)

Client Identifier: **69547**
Date of Request: 05/08/98
The Current Database is NJ-CORP
Your Terms and Connectors Query:

NAME(EWH CHEMICAL)

BBJ000011

*START*START*START*START*START*START*START*START*START*START*START*START*START*START*

Search Result Rank 1 of 1

Information current through 05/08/1998	
Update Frequency:	As Current As SoS
Source:	Secretary of State
Name:	E.W.H. CHEMICAL CORPORATION
Agent Name:	ELIAS SINGER
Title:	Registered Agent
Address:	338 WILSON AVE NEWARK NJ 07105
Status:	AGENT CHANGED
Date of Appointment:	06/23/80
Type:	DOMESTIC PROFIT State of Origin NEW JERSEY
Date of Filing:	08/10/1956
Status:	DISSOLVE AFTER COMMENCING BUSINESS
Suspension Date:	03/02/82
Annual Report Date:	03/19/82
State ID Number:	8957575000
Annual Report Due Date:	08/81
Lst Yr Ann Rpt Filed:	81

END OF DOCUMENT

*END*END*END*END*END*END*END*END*END*END*END*END*END*END*END*END*END*END*END*END*END*

939529 - MCRAE,JANIS

Date and Time Printing Started:	05/08/98	12:29:39 pm (Central)
Date and Time Printing Ended:	05/08/98	12:29:40 pm (Central)
Offline Transmission Time:		00:00:01
Number of Requests in Group:	1	
Number of Lines Charged:	31	

*END*END*END*END*END*END*END*END*END*END*END*END*END*END*END*END*END*END*END*END*END*

932250237

G12

932250238

81ST DOCUMENT of Level 1 printed in FULL format.

Toxic Chemical Release Inventory
TRIS

EPA-ID: NJD002144517

TROY CHEMICAL CORP.
ONE AVE. L
NEWARK, NJ 07105

REPORTING-YEAR: 1991

EPA-REGION: 02

COUNTY: ESSEX

COUNTY-CODE: 34013

LATITUDE: 0404302

LONGITUDE: 0740843

D&B-NO: 004679050

TRIS-ID: 07105TRYCHONEAV
2851 - MFG-PAINTS & ALLIED PRODUCTS

CONTACT-NAME: ALEXANDER GERARDO

CONTACT-PHONE: 201-589-2500

COVERED-FACILITY: Data covers an entire facility

PARENT-COMPANY: TROY CORP.

PARENT-D&B-NO: NA
Chemical Info
CAS #: 000095636
Name: 1,2,4-TRIMETHYLBENZENE
Trade Secret: No
Max. Amt. On-site: 1,000 TO 9,999
Max. Amt. On-site midpoint: 5500
Manufacture/Process/Other Use Info
Process: process: as a formulation component
Release/Transfer Info
Release Medium: Non-Point Air Release
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00
Basis for Estimate: other
Release/Transfer Info
Release Medium: Point Air Release
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00

BBJ000003

93225023

Basis for Estimate: other
Release/Transfer Info
Release Medium: Land Release
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00
Basis for Estimate: other
Land Disposal Type: other
Release/Transfer Info
Release Medium: POTW Transfer
POTW Address:
PASSAIC VALEY SEWER AUTH.
600 WILSON AVE.
NEWARK, NJ 07105
County: ESSEX
Location is not under control of reporting facility or parent company
Release/Transfer Info
Release Medium: POTW Transfer
POTW Address:
NA
Location is not under control of reporting facility or parent company
Release/Transfer Info
Release Medium: Offsite Transfer
Offsite Location EPA-ID: NJD980536593
Offsite Location Address:
ADVANCED ENVIRONMENTAL TECHNOLOGY CORP.
GOLDMINE RD.
FLANDERS, NJ 07836
County: MORRIS
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00
Basis for Estimate: other
Treatment/Disposal Method: LANDFILL/DISPOSAL SURFACE IMPOUNDMENT
Release/Transfer Info
Release Medium: Offsite Transfer
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00
Basis for Estimate: other
Release/Transfer Summary(lbs)
Air: 500.00
Land: 250.00
All Releases: 750.00
POTW: 250.00
Offsite: 250.00
All Transfers: 500.00
All Releases & Transfers: 1250.00
Waste Treatment Info
General Wastestream: WASTEWATER (AQUEOUS WASTE)
Treatment Method: OIL SKIMMING
Influent Concentration: 1 PART PER MILLION TO 100 PARTS PER MILLION
Treatment Efficiency: 69.00
Qty Released Prior Year: 475.000000
Qty Released Current Year: 390.000000

93225240

Percent Change from Previous Yr to Current Yr: -000000018
Qty Released Following Year: 430.000000
Qty Released Second Year: 470.000000
Qty Used for Energy Recovery Onsite Prior Yr: 0.000000
Qty Used for Energy Recovery Onsite Current Yr: 0.000000
Percent Change in Energy Onsite from Previous Yr to Current Yr: 0000000000
Qty Used for Energy Recovery Onsite Following Yr: 0.000000
Qty Used for Energy Recovery Onsite Second Yr: 0.000000
Qty Used for Energy Recovery Offsite Prior Yr: 0.000000
Qty Used for Energy Recovery Offsite Current Yr: 0.000000
Percent Change in Energy Recovery Offsite from Previous Yr to Current Yr: 0000000000
Qty Used for Energy Recovery Offsite Following Yr: 0.000000
Qty Used for Energy Recovery Offsite Second Yr: 0.000000
Qty Recycled Onsite Prior Yr: 0.000000
Qty Recycled Onsite Current Yr: 0.000000
Percent Change in Energy Recycled Onsite from Previous Yr to Current Yr: 0000000000
Qty Recycled Onsite Following Yr: 0.000000
Qty Recycled Onsite Second Yr: 0.000000
Qty Recycled Offsite Prior Yr: 0.000000
Qty Recycled Offsite Current Yr: 0.000000
Percent Change in Energy Recycled Offsite from Previous Yr to Current Yr: 0000000000
Qty Recycled Offsite Following Yr: 0.000000
Qty Recycled Offsite Second Yr: 0.000000
Qty Treated Onsite Prior Yr: 100.000000
Qty Treated Onsite Current Yr: 205.000000
Percent Change in Qty Treated Onsite from Previous Yr to Current Yr: 0000000105
Qty Treated Onsite Following Yr: 230.000000
Qty Treated Onsite Second Yr: 240.000
Qty Treated Offsite Prior Yr: 400.000
Qty Treated Offsite Current Yr: 490.000
Percent Change in Qty Treated Offsite from Previous Yr to Current Yr: 0000000022
Qty Treated Offsite Following Yr: 540.000
Qty Treated Offsite Second Yr: 590.000
Total Previous Yr: 975.000
Total Current Yr: 1085.000
Total Following Yr: 1200.000
Total Second Yr: 1300.000
Qty released to Environment as a Result of Remed.Actions, Catastrophic Events or Other Events: 0.000
Production Ratio or Activity Index: 0.830
Additional PPA Data: Not Included with Submission
Source Reduction Activity: NA
Source Reduction Method: NA

Chemical Info
CAS #: NA
Name: MERCURY COMPOUNDS
Trade Secret: No
Max. Amt. On-site: 10,000 TO 99,999
Max. Amt. On-site midpoint: 55000
Manufacture/Process/Other Use Info
Manufacture: manufacture: for sale/distribution

932250241

Release/Transfer Info
Release Medium: Non-Point Air Release
Location is not under control of reporting facility or parent company
Basis for Estimate: other
Release/Transfer Info
Release Medium: Point Air Release
Location is not under control of reporting facility or parent company
Basis for Estimate: other
Release/Transfer Info
Release Medium: POTW Transfer
POTW Address:
PASSAIC VALLEY SEWER AUTH.
600 WILSON AVE.
NEWARK, NJ 07105
County: ESSEX
Location is not under control of reporting facility or parent company
Release/Transfer Info
Release Medium: POTW Transfer
POTW Address:
NA
Location is not under control of reporting facility or parent company
Release/Transfer Info
Release Medium: POTW Transfer
Location is not under control of reporting facility or parent company
Basis for Estimate: based on monitoring data
Release/Transfer Summary(lbs)
Waste Treatment Info
General Wastestream: WASTEWATER (AQUEOUS WASTE)
Treatment Method: OIL SKIMMING
Influent Concentration: 1 PART PER BILLION TO 1 PART PER MILLION
Treatment Efficiency: 55.00
Qty Released Prior Year: 0.000000
Qty Released Current Year: 0.000000
Percent Change from Previous Yr to Current Yr: 0000000000
Qty Released Following Year: 0.000000
Qty Released Second Year: 0.000000
Qty Used for Energy Recovery Onsite Prior Yr: 0.000000
Qty Used for Energy Recovery Onsite Current Yr: 0.000000
Percent Change in Energy Onsite from Previous Yr to Current Yr: 0000000000
Qty Used for Energy Recovery Onsite Following Yr: 0.000000
Qty Used for Energy Recovery Onsite Second Yr: 0.000000
Qty Used for Energy Recovery Offsite Prior Yr: 0.000000
Qty Used for Energy Recovery Offsite Current Yr: 0.000000
Percent Change in Energy Recovery Offsite from Previous Yr to Current Yr: 0000000000
Qty Used for Energy Recovery Offsite Following Yr: 0.000000
Qty Used for Energy Recovery Offsite Second Yr: 0.000000
Qty Recycled Onsite Prior Yr: 0.000000
Qty Recycled Onsite Current Yr: 0.000000
Percent Change in Energy Recycled Onsite from Previous Yr to Current Yr: 0000000000
Qty Recycled Onsite Following Yr: 0.000000
Qty Recycled Onsite Second Yr: 0.000000
Qty Recycled Offsite Prior Yr: 0.000000
Qty Recycled Offsite Current Yr: 0.000000

Percent Change in Energy Recycled Offsite from Previous Yr to Current
Yr: 0000000000
Qty Recycled Offsite Following Yr: 0.000000
Qty Recycled Offsite Second Yr: 0.000000
Qty Treated Onsite Prior Yr: 40.000000
Qty Treated Onsite Current Yr: 0.000000
Percent Change in Qty Treated Onsite from Previous Yr to Current Yr: 0000000000
Qty Treated Onsite Following Yr: 0.000000
Qty Treated Onsite Second Yr: 0.000
Qty Treated Offsite Prior Yr: 35.000
Qty Treated Offsite Current Yr: 0.000
Percent Change in Qty Treated Offsite from Previous Yr to Current Yr: 0000000000
Qty Treated Offsite Following Yr: 0.000
Qty Treated Offsite Second Yr: 0.000
Total Previous Yr: 75.000
Total Current Yr: 0.000
Total Following Yr: 0.000
Total Second Yr: 0.000
Qty released to Environment as a Result of Remed.Actions, Catastrophic Events or
Other Events: 0.000
Production Ratio or Activity Index: 0.780
Additional PPA Data: Not Included with Submission
Source Reduction Activity: NA
Source Reduction Method: NA

Chemical Info
CAS #: 000100425
Name: STYRENE
Trade Secret: No
Max. Amt. On-site: 10,000 TO 99,999
Max. Amt. On-site midpoint: 55000
Manufacture/Process/Other Use Info
Process: process: as a reactant
Release/Transfer Info
Release Medium: Non-Point Air Release
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00
Basis for Estimate: other
Release/Transfer Info
Release Medium: Point Air Release
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00
Basis for Estimate: other
Release/Transfer Info
Release Medium: Land Release
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 5.00
Basis for Estimate: other
Land Disposal Type: other
Release/Transfer Info
Release Medium: POTW Transfer
POTW Address:

PASSAIC VALEY SEWER AUTH.
600 WILSON AVE.
NEWARK, NJ 07105
County: ESSEX
Location is not under control of reporting facility or parent company
Release/Transfer Info
Release Medium: POTW Transfer
POTW Address:
NA
Location is not under control of reporting facility or parent company
Release/Transfer Info
Release Medium: POTW Transfer
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00
Basis for Estimate: other
Release/Transfer Summary(lbs)
Air: 500.00
Land: 5.00
All Releases: 505.00
POTW: 250.00
All Transfers: 250.00
All Releases & Transfers: 755.00
Waste Treatment Info
General Wastestream: WASTEWATER (AQUEOUS WASTE)
Treatment Method: OIL SKIMMING
Influent Concentration: 1 PART PER MILLION TO 100 PARTS PER MILLION
Treatment Efficiency: 68.00
Qty Released Prior Year: 200.000000
Qty Released Current Year: 400.000000
Percent Change from Previous Yr to Current Yr: 0000000100
Qty Released Following Year: 420.000000
Qty Released Second Year: 430.000000
Qty Used for Energy Recovery Onsite Prior Yr: 0.000000
Qty Used for Energy Recovery Onsite Current Yr: 0.000000
Percent Change in Energy Onsite from Previous Yr to Current Yr: 0000000000
Qty Used for Energy Recovery Onsite Following Yr: 0.000000
Qty Used for Energy Recovery Onsite Second Yr: 0.000000
Qty Used for Energy Recovery Offsite Prior Yr: 0.000000
Qty Used for Energy Recovery Offsite Current Yr: 0.000000
Percent Change in Energy Recovery Offsite from Previous Yr to Current
Yr: 0000000000
Qty Used for Energy Recovery Offsite Following Yr: 0.000000
Qty Used for Energy Recovery Offsite Second Yr: 0.000000
Qty Recycled Onsite Prior Yr: 0.000000
Qty Recycled Onsite Current Yr: 0.000000
Percent Change in Energy Recycled Onsite from Previous Yr to Current
Yr: 0000000000
Qty Recycled Onsite Following Yr: 0.000000
Qty Recycled Onsite Second Yr: 0.000000
Qty Recycled Offsite Prior Yr: 0.000000
Qty Recycled Offsite Current Yr: 0.000000
Percent Change in Energy Recycled Offsite from Previous Yr to Current
Yr: 0000000000
Qty Recycled Offsite Following Yr: 0.000000

Qty Recycled Offsite Second Yr: 0.000000
Qty Treated Onsite Prior Yr: 30.000000
Qty Treated Onsite Current Yr: 287.000000
Percent Change in Qty Treated Onsite from Previous Yr to Current Yr: 0000000856
Qty Treated Onsite Following Yr: 300.000000
Qty Treated Onsite Second Yr: 320.000
Qty Treated Offsite Prior Yr: 30.000
Qty Treated Offsite Current Yr: 135.000
Percent Change in Qty Treated Offsite from Previous Yr to Current Yr: 0000000350
Qty Treated Offsite Following Yr: 140.000
Qty Treated Offsite Second Yr: 145.000
Total Previous Yr: 260.000
Total Current Yr: 822.000
Total Following Yr: 860.000
Total Second Yr: 895.000
Qty released to Environment as a Result of Remed.Actions, Catastrophic Events or Other Events: 0.000
Production Ratio or Activity Index: 1.140
Additional PPA Data: Not Included with Submission
Source Reduction Activity: NA
Source Reduction Method: NA

Chemical Info
CAS #: 007664939
Name: SULFURIC ACID
Trade Secret: No
Max. Amt. On-site: 10,000 TO 99,999
Max. Amt. On-site midpoint: 55000
Manufacture/Process/Other Use Info
Process: process: as a reactant
Release/Transfer Info
Release Medium: Non-Point Air Release
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 5.00
Basis for Estimate: other
Release/Transfer Info
Release Medium: Point Air Release
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 5.00
Basis for Estimate: other
Release/Transfer Info
Release Medium: Land Release
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00
Basis for Estimate: other
Land Disposal Type: other
Release/Transfer Info
Release Medium: POTW Transfer
POTW Address:
PASSAIC VALEY SEWER AUTH.
600 WILSON AVE.
NEWARK, NJ 07105

County: ESSEX
Location is not under control of reporting facility or parent company
Release/Transfer Info
Release Medium: POTW Transfer
POTW Address:
NA
Location is not under control of reporting facility or parent company
Release/Transfer Info
Release Medium: POTW Transfer
Location is not under control of reporting facility or parent company
Basis for Estimate: other
Release/Transfer Summary(lbs)
Air: 10.00
Land: 250.00
All Releases: 260.00
All Releases & Transfers: 260.00
Waste Treatment Info
General Wastestream: WASTEWATER (AQUEOUS WASTE)
Qty Released Prior Year: 50.000000
Qty Released Current Year: 35.000000
Percent Change from Previous Yr to Current Yr: -000000030
Qty Released Following Year: 15.000000
Qty Released Second Year: 10.000000
Qty Used for Energy Recovery Onsite Prior Yr: 0.000000
Qty Used for Energy Recovery Onsite Current Yr: 0.000000
Percent Change in Energy Onsite from Previous Yr to Current Yr: 0000000000
Qty Used for Energy Recovery Onsite Following Yr: 0.000000
Qty Used for Energy Recovery Onsite Second Yr: 0.000000
Qty Used for Energy Recovery Offsite Prior Yr: 0.000000
Qty Used for Energy Recovery Offsite Current Yr: 0.000000
Percent Change in Energy Recovery Offsite from Previous Yr to Current Yr: 0000000000
Qty Used for Energy Recovery Offsite Following Yr: 0.000000
Qty Used for Energy Recovery Offsite Second Yr: 0.000000
Qty Recycled Onsite Prior Yr: 0.000000
Qty Recycled Onsite Current Yr: 0.000000
Percent Change in Energy Recycled Onsite from Previous Yr to Current Yr: 0000000000
Qty Recycled Onsite Following Yr: 0.000000
Qty Recycled Onsite Second Yr: 0.000000
Qty Recycled Offsite Prior Yr: 0.000000
Qty Recycled Offsite Current Yr: 0.000000
Percent Change in Energy Recycled Offsite from Previous Yr to Current Yr: 0000000000
Qty Recycled Offsite Following Yr: 0.000000
Qty Recycled Offsite Second Yr: 0.000000
Qty Treated Onsite Prior Yr: 0.000000
Qty Treated Onsite Current Yr: 0.000000
Percent Change in Qty Treated Onsite from Previous Yr to Current Yr: 0000000000
Qty Treated Onsite Following Yr: 0.000000
Qty Treated Onsite Second Yr: 0.000
Qty Treated Offsite Prior Yr: 0.000
Qty Treated Offsite Current Yr: 0.000
Percent Change in Qty Treated Offsite from Previous Yr to Current Yr: 0000000000
Qty Treated Offsite Following Yr: 0.000

Qty Treated Offsite Second Yr: 0.000
Total Previous Yr: 50.000
Total Current Yr: 35.000
Total Following Yr: 15.000
Total Second Yr: 10.000
Qty released to Environment as a Result of Remed.Actions, Catastrophic Events or Other Events: 0.000
Production Ratio or Activity Index: 1.200
Additional PPA Data: Not Included with Submission
Source Reduction Activity: NA
Source Reduction Method: NA

Chemical Info
CAS #: 000108316
Name: MALEIC ANHYDRIDE
Trade Secret: No
Max. Amt. On-site: 1,000 TO 9,999
Max. Amt. On-site midpoint: 5500
Manufacture/Process/Other Use Info
Process: process: as a formulation component
Release/Transfer Info
Release Medium: Non-Point Air Release
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00
Basis for Estimate: other
Release/Transfer Info
Release Medium: Point Air Release
Location is not under control of reporting facility or parent company
Basis for Estimate: other
Release/Transfer Info
Release Medium: Land Release
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00
Basis for Estimate: other
Land Disposal Type: other
Release/Transfer Info
Release Medium: POTW Transfer
POTW Address:
PASSAIC VALLEY SEWER AUTH.
600 WILSON AVE.
NEWARK, NJ 07105
County: ESSEX
Location is not under control of reporting facility or parent company
Release/Transfer Info
Release Medium: POTW Transfer
POTW Address:
NA
Location is not under control of reporting facility or parent company
Release/Transfer Info
Release Medium: POTW Transfer
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 5.00

Basis for Estimate: other
Release/Transfer Summary(lbs)
Air: 250.00
Land: 250.00
All Releases: 500.00
POTW: 5.00
All Transfers: 5.00
All Releases & Transfers: 505.00
Waste Treatment Info
General Wastestream: WASTEWATER (AQUEOUS WASTE)
Qty Released Prior Year: 0.000000
Qty Released Current Year: 95.000000
Percent Change from Previous Yr to Current Yr: 0000000000
Qty Released Following Year: 110.000000
Qty Released Second Year: 125.000000
Qty Used for Energy Recovery Onsite Prior Yr: 0.000000
Qty Used for Energy Recovery Onsite Current Yr: 0.000000
Percent Change in Energy Onsite from Previous Yr to Current Yr: 0000000000
Qty Used for Energy Recovery Onsite Following Yr: 0.000000
Qty Used for Energy Recovery Onsite Second Yr: 0.000000
Qty Used for Energy Recovery Offsite Prior Yr: 0.000000
Qty Used for Energy Recovery Offsite Current Yr: 0.000000
Percent Change in Energy Recovery Offsite from Previous Yr to Current Yr: 0000000000
Qty Used for Energy Recovery Offsite Following Yr: 0.000000
Qty Used for Energy Recovery Offsite Second Yr: 0.000000
Qty Recycled Onsite Prior Yr: 0.000000
Qty Recycled Onsite Current Yr: 0.000000
Percent Change in Energy Recycled Onsite from Previous Yr to Current Yr: 0000000000
Qty Recycled Onsite Following Yr: 0.000000
Qty Recycled Onsite Second Yr: 0.000000
Qty Recycled Offsite Prior Yr: 0.000000
Qty Recycled Offsite Current Yr: 0.000000
Percent Change in Energy Recycled Offsite from Previous Yr to Current Yr: 0000000000
Qty Recycled Offsite Following Yr: 0.000000
Qty Recycled Offsite Second Yr: 0.000000
Qty Treated Onsite Prior Yr: 0.000000
Qty Treated Onsite Current Yr: 0.000000
Percent Change in Qty Treated Onsite from Previous Yr to Current Yr: 0000000000
Qty Treated Onsite Following Yr: 0.000000
Qty Treated Onsite Second Yr: 0.000
Qty Treated Offsite Prior Yr: 0.000
Qty Treated Offsite Current Yr: 5.000
Percent Change in Qty Treated Offsite from Previous Yr to Current Yr: 0000000000
Qty Treated Offsite Following Yr: 7.000
Qty Treated Offsite Second Yr: 9.000
Total Previous Yr: 0.000
Total Current Yr: 100.000
Total Following Yr: 117.000
Total Second Yr: 134.000
Qty released to Environment as a Result of Remed.Actions, Catastrophic Events or Other Events: 0.000
Production Ratio or Activity Index: 1.300

Additional PPA Data: Not Included with Submission
Source Reduction Activity: NA
Source Reduction Method: NA

Chemical Info
CAS #: NA
Name: COBALT COMPOUNDS
Trade Secret: No
Max. Amt. On-site: 10,000 TO 99,999
Max. Amt. On-site midpoint: 55000
Manufacture/Process/Other Use Info
Manufacture: manufacture: for sale/distribution
Process: process: as a reactant
Release/Transfer Info
Release Medium: Non-Point Air Release
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00
Basis for Estimate: other
Release/Transfer Info
Release Medium: Point Air Release
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00
Basis for Estimate: other
Release/Transfer Info
Release Medium: Land Release
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00
Basis for Estimate: other
Land Disposal Type: other
Release/Transfer Info
Release Medium: POTW Transfer
POTW Address:
PASSAIC VALLEY SEWER AUTH.
600 WILSON AVE.
NEWARK, NJ 07105
County: ESSEX
Location is not under control of reporting facility or parent company
Release/Transfer Info
Release Medium: POTW Transfer
POTW Address:
NA
Location is not under control of reporting facility or parent company
Release/Transfer Info
Release Medium: Offsite Transfer
Offsite Location EPA-ID: NJD980536593
Offsite Location Address:
ADVANCED ENIRONMENTAL TECHNOLOGY CORP.
GOLDMINE RD.
FLANDERS, NJ 07836
County: MORRIS
Location is not under control of reporting facility or parent company
Range: Midpoint of range

Amount: 250.00
Basis for Estimate: other
Treatment/Disposal Method: LANDFILL/DISPOSAL SURFACE IMPOUNDMENT
Release/Transfer Info
Release Medium: Offsite Transfer
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00
Basis for Estimate: other
Release/Transfer Summary(lbs)
Air: 500.00
Land: 250.00
All Releases: 750.00
POTW: 250.00
Offsite: 250.00
All Transfers: 500.00
All Releases & Transfers: 1250.00
Waste Treatment Info
General Wastestream: WASTEWATER (AQUEOUS WASTE)
Treatment Method: OIL SKIMMING
Influent Concentration: 1 PART PER MILLION TO 100 PARTS PER MILLION
Treatment Efficiency: 3.00
Qty Released Prior Year: 140.000000
Qty Released Current Year: 140.000000
Percent Change from Previous Yr to Current Yr: 0000000000
Qty Released Following Year: 140.000000
Qty Released Second Year: 140.000000
Qty Used for Energy Recovery Onsite Prior Yr: 0.000000
Qty Used for Energy Recovery Onsite Current Yr: 0.000000
Percent Change in Energy Onsite from Previous Yr to Current Yr: 0000000000
Qty Used for Energy Recovery Onsite Following Yr: 0.000000
Qty Used for Energy Recovery Onsite Second Yr: 0.000000
Qty Used for Energy Recovery Offsite Prior Yr: 0.000000
Qty Used for Energy Recovery Offsite Current Yr: 0.000000
Percent Change in Energy Recovery Offsite from Previous Yr to Current Yr: 0000000000
Qty Used for Energy Recovery Offsite Following Yr: 0.000000
Qty Used for Energy Recovery Offsite Second Yr: 0.000000
Qty Recycled Onsite Prior Yr: 0.000000
Qty Recycled Onsite Current Yr: 0.000000
Percent Change in Energy Recycled Onsite from Previous Yr to Current Yr: 0000000000
Qty Recycled Onsite Following Yr: 0.000000
Qty Recycled Onsite Second Yr: 0.000000
Qty Recycled Offsite Prior Yr: 0.000000
Qty Recycled Offsite Current Yr: 0.000000
Percent Change in Energy Recycled Offsite from Previous Yr to Current Yr: 0000000000
Qty Recycled Offsite Following Yr: 0.000000
Qty Recycled Offsite Second Yr: 0.000000
Qty Treated Onsite Prior Yr: 0.000000
Qty Treated Onsite Current Yr: 10.000000
Percent Change in Qty Treated Onsite from Previous Yr to Current Yr: 0000000000
Qty Treated Onsite Following Yr: 10.000000
Qty Treated Onsite Second Yr: 10.000

Qty Treated Offsite Prior Yr: 850.000
Qty Treated Offsite Current Yr: 810.000
Percent Change in Qty Treated Offsite from Previous Yr to Current Yr: -000000005
Qty Treated Offsite Following Yr: 840.000
Qty Treated Offsite Second Yr: 840.000
Total Previous Yr: 990.000
Total Current Yr: 960.000
Total Following Yr: 990.000
Total Second Yr: 990.000
Qty released to Environment as a Result of Remed.Actions, Catastrophic Events or Other Events: 0.000
Production Ratio or Activity Index: 0.900
Additional PPA Data: Not Included with Submission
Source Reduction Activity: NA
Source Reduction Method: NA

Chemical Info
CAS #: 000067561
Name: METHANOL
Trade Secret: No
Max. Amt. On-site: 10,000 TO 99,999
Max. Amt. On-site midpoint: 55000
Manufacture/Process/Other Use Info
Other Use: otherwise used: as a chemical processing aid
Release/Transfer Info
Release Medium: Non-Point Air Release
Location is not under control of reporting facility or parent company
Range: Estimate
Amount: 8000.00
Basis for Estimate: other
Release/Transfer Info
Release Medium: Point Air Release
Location is not under control of reporting facility or parent company
Range: Estimate
Amount: 13500.00
Basis for Estimate: other
Release/Transfer Info
Release Medium: Land Release
Location is not under control of reporting facility or parent company
Range: Midpoint of range
Amount: 250.00
Basis for Estimate: other
Land Disposal Type: other
Release/Transfer Info
Release Medium: POTW Transfer
POTW Address:
PASSAIC VALLEY SEWER AUTH.
600 WILSON AVE.
NEWARK, NJ 07105
County: ESSEX
Location is not under control of reporting facility or parent company
Release/Transfer Info
Release Medium: POTW Transfer
POTW Address:
NA

Location is not under control of reporting facility or parent company
Release/Transfer Info
Release Medium: POTW Transfer
Location is not under control of reporting facility or parent company
Range: Estimate
Amount: 635800.00
Basis for Estimate: other
Release/Transfer Summary(lbs)
Air: 21500.00
Land: 250.00
All Releases: 21750.00
POTW: 635800.00
All Transfers: 635800.00
All Releases & Transfers: 657550.00
Waste Treatment Info
General Wastestream: WASTEWATER (AQUEOUS WASTE)
Treatment Method: OIL SKIMMING
Influent Concentration: GREATER THAN 1 PERCENT
Qty Released Prior Year: 32600.000000
Qty Released Current Year: 21900.000000
Percent Change from Previous Yr to Current Yr: -000000033
Qty Released Following Year: 20000.000000
Qty Released Second Year: 19000.000000
Qty Used for Energy Recovery Onsite Prior Yr: 0.000000
Qty Used for Energy Recovery Onsite Current Yr: 0.000000
Percent Change in Energy Onsite from Previous Yr to Current Yr: 0000000000
Qty Used for Energy Recovery Onsite Following Yr: 0.000000
Qty Used for Energy Recovery Onsite Second Yr: 0.000000
Qty Used for Energy Recovery Offsite Prior Yr: 0.000000
Qty Used for Energy Recovery Offsite Current Yr: 0.000000
Percent Change in Energy Recovery Offsite from Previous Yr to Current
Yr: 0000000000
Qty Used for Energy Recovery Offsite Following Yr: 0.000000
Qty Used for Energy Recovery Offsite Second Yr: 0.000000
Qty Recycled Onsite Prior Yr: 3842187.000000
Qty Recycled Onsite Current Yr: 3874685.000000
Percent Change in Energy Recycled Onsite from Previous Yr to Current
Yr: 0000000000 Jx/ J
Qty Recycled Onsite Following Yr: 4457100.000000
Qty Recycled Onsite Second Yr: 5101500.000000
Qty Recycled Offsite Prior Yr: 0.000000
Qty Recycled Offsite Current Yr: 0.000000
Percent Change in Energy Recycled Offsite from Previous Yr to Current
Yr: 0000000000
Qty Recycled Offsite Following Yr: 0.000000
Qty Recycled Offsite Second Yr: 0.000000
Qty Treated Onsite Prior Yr: 0.000000
Qty Treated Onsite Current Yr: 0.000000
Percent Change in Qty Treated Onsite from Previous Yr to Current Yr: 0000000000
Qty Treated Onsite Following Yr: 0.000000
Qty Treated Onsite Second Yr: 0.000
Qty Treated Offsite Prior Yr: 600000.000
Qty Treated Offsite Current Yr: 635800.000
Percent Change in Qty Treated Offsite from Previous Yr to Current Yr: 0000000005
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Qty Treated Offsite Following Yr: 695000.000
Qty Treated Offsite Second Yr: 750000.000
Total Previous Yr: 4474787.000
Total Current Yr: 4532385.000
Total Following Yr: 5172100.000
Total Second Yr: 5870500.000
Qty released to Environment as a Result of Remed.Actions, Catastrophic Events or Other Events: 0.000
Production Ratio or Activity Index: 0.990
Additional PPA Data: Not Included with Submission
Onsite Energy Recycling Process: R13 - Solvents/Organics Recovery - Fractionation
Source Reduction Activity: NA
Source Reduction Method: NA

932250255

Edward J. Faille

Scott Mc Cone ⟶

Albert steel Drum and Related Properties in Newark.

June 9, 1977

On June 2nd, 6th, and 7th of this year, I conducted field inspections at Albert Steel Drum and the other properties in the area. Inspections of Troy Chemical Corporation, Frena Smelting and Refining Company, Welch, Holmes, and Clark Company, and the Prentis Drug and Chemical Company were conducted to determine if they had any discharges into the drainage ditch.

Thursday, June 2, 1977

At 1945, Mr. John Vernam and I arrived on scene at Albert Steel Drum and met with Mr. Albert Greenman, the owner of Albert Steel Drum. We toured the facility and observed that a heavy oil sheen was passing from Albert's property and into the drainage ditch. Mr. Vernam asked Mr. Greenman about the discharge and Mr. Greenman said that the increa d flow was the result of a rainstorm. We traced the oil sheen back to the outfall by the loading dock at Albert Steel Drum and observed that water mixed with oil was bubbling out of the ground. Mr. Vernam asked where the discharge was coming from and Mr. Greenman said that it was coming from the exterior drum wash. Mr. Vernam stated that the court order had required that all discharges from Albert Steel Drum cease. Mr. Greenman stated that he felt that the order only restricted the discharge from the interior drum wash and that all interior drum washings were going into a tank trailer beside the loading dock. At 1015, an inspection of the building was condu and oily material was observed on the floor around the washing equipment. Mr. Ver asked where the material on the floor was going and Mr. Greenman said that the mat must migrate into the ground. Mr. Vernam then informed Mr. Greenman that it was h opinion that oil and chemicals were continually being discharged into the ground, polluting the ground waters. This discharge was the result of the antiquated desi of the facility. Mr. Greenman made no statement. Mr. Vernam asked when the sanita sewer connection would be made and Mr. Greenman said that everything was ready but work could start until a permit was obtained. At 1030, we secured.

At 1035, Mr. Vernam and I arrived at Troy Chemical Corportation and met with Mr. Mi Novak, vice president. Troy was constructing a permanent containment wall along the drainage ditch. Mr. Vernam asked about discharges into the east drainage ditch and Mr. Novak said that only a cesspool overflow discharged into the ditch. Mr. Vernam asked what material discharged into the west drainage ditch and Mr. Novak said that only cooling water was discharged. At 1045, we commenced a tour of the facility and observed a broken sheen in the west drainage ditch. An estimated fifteen discharges cooling water were observed going into the ditch. We observed that spilled material present in a diked area where the drainage pipe discharged into the drainage ditch. s of waste chemicals were present in the rear of the property and a few of them were leaking onto the ground. Mr. Vernam recommended that all discharges go to the sanitary sewer. At 1110, we secured.

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Exhibit 4

Monday, June 6, 1977

At 0850, I arrived at Albert Steel Drum and observed that personnel from Duane Marine were cleaning the bank of the drainage ditch by Troy Chemical. The Duane Marine Supervisor informed me that oil had been found further downstream, but he did not think that it had come from Albert Steel Drum. I informed the supervisor that I would look into the problem. At 0910, I met with Mr. Hoffman, the operation manager for Troy Chemical, and informed him that all discharges into the ditch sould be stoppe Mr. Hoffman said that I should send a letter to Troy Chemical Corporation requesting that all effluent be tied into the sanitary sewer line. I conducted another inspectio of the facility and this time was told that there were waste pits in the rear of the property by the drum area. Mr. Hoffman was going to have Duane Marine haul the materi away. At 0915, I dye-tested the floor drains at Troy to determine if any fo the material was entering the ditch. No dye showed up. At 1945, I secured.

At 1000, I commenced a survey of the drainage ditch (see case 77-6-610 for cleanup downstream) Where is this?

At 1045, I arrived on scene at Frema Smelting and Refining Company (201-589-2563) and met with Mr. Otto Adler, the owner. I asked Mr. Adler if he discharged anything into the drainage ditch and he said that there were three lines that emptied into the ditch two from sumps and one from a cesspool. I checked the two sumps and observed that onl water was present in the sumps. I asked him if any oil was used at the facility and was told that only hydraulic oil was used to crush metal. No chemical were used in the process. At 1055, I secured. Where

At 1100, Mr. Ed Faille and I entered Welch, Holme and Clark Company, Inc, and met with Mr. Ted Celesky, the facility operator. We asked him if he had any discharges into the drainage ditch. Mr. Faille asked what kind of material was used at the facility and Mr. Gelesky said that fatty acid was stored in the above ground tanks at the rear of the property. The fatty acid is used in the production of cleaning compounds and resin Soy oil, corn oil, and safflower oil are delivered in bulk to the facility in tank cars The bulk vegetable oils are placed in 55 gallon drums and sold.

At 1115, we conducted a tour of the facility. We observed that there was no dike aroun the fatty acid storage tanks. The ground around the tanks was contaminated with fatty acid and one of the yard drains was only 20 feet away. Mr. Faille asked Mr. Gelesky if he had an SPCC Plan for the facility and he said that he did. He also said that the dikes that had been around the tank had been removed when additional tankage was installed. There is presently 104,000 gallons of storage capacity for the fatty acid and 3,000 gallons of storage capacity for the number 2 fuel oil. Mr. Faille informed Mr. Gelesky that he would have to remove the contaminated ground around the storage tanks and install drip pans under each of the transfer valves. Mr. Gelesky said that he would do so. At 1130, we secured.

Tuesday, June 7, 1977

At 1430, I arrived on scene at Troy Chemical Corp. and observed that removal of the contaminated bank at Troy had been completely removed. I noticed that a broken sheen wa present on the water in the west drainage ditch above Troy Chemicals. I went to the

company directly upstream from Troy Chemical and found that it was a chemical compan
At 1450, I arrived on scene at Prentiss Drug and Chemical Company and met with Mr.
John W. Englert, the plant superintendent. I asked Mr. Englert what types of produc
were handled at the facility and he said that different types of pesticides were pro
at the plant. I asked him if any dyes were used in the process and he said that a
green dye was used in the production of Rax Powder, a rodenticide.

At 1505, I conducted a survey of the facility and noticed that there were floor drai
that emptied outside. I asked Mr. Englert where the drains emptied and he said that
they just ran outside. I checked the drains but did not observe a discoloration of
the water. I asked Mr. Englert if there was any discharge of chemicals from the faci
and he said that all waste went into the sanitary sewer line. I obtained a specimen
label and at 1520 I secured after learning that another dye company called Otto B.
Hise had a building just up the street.

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September 15, 1998
Project 83611-001.000

Mr. Gregory Zalaskus
Case Manager
New Jersey Department of
Environmental Protection
Site Remediation Program
Bureau of State Case Management
P.O. Box 28
401 East State Street
Trenton, New Jersey 08625-0028

Re: Remedial Investigation
MOA Dated July 20, 1993

Dear Mr. Zalaskus:

On behalf of Troy Chemical Corporation, Inc. (Troy), below please find responses to the comments provided in your correspondence of June 25, 1998. In order to facilitate your review, the responses are numbered and presented as they appear in your letter.

As an attachment to this letter, Troy is submitting an RI Addendum Report that presents and interprets additional groundwater and surface water sampling performed in December 1997. These additional results provide confirmation and clarification of site conditions. The data from this report are referenced as appropriate in this response letter.

As indicated in the relevant responses below, Troy intends to continue with additional investigation to characterize the site and provide input into the evaluation of remedial alternatives.

2.1 <u>Project History</u>

1. Agreed: The text will state that the postponement of the creek investigation was a Troy recommendation agreed to by the Department.

2. Agreed: references to the status of the Newark investigation will be deleted.

3. The Department's position on the general scope of the soil investigation is acknowledged. Troy would like to note that, issues of the scope aside, the Department did not provide final comments on the procedural aspects of the program. However, since, Troy proceeded in accordance with the Technical Regulations for Site Remediation ("Tech Regs"), and since

the Department has not indicated in any way that the data that have been collected are deficient, Troy is satisfied. It is assumed that the current data will be acceptable for use in conjunction with any future information obtained.

4. Agreed: A listing of historical products and by-products will be provided to the best of Troy's ability based on the information available.

3.2 Geology/Hydrogeology

5/6. Agreed: The comparable section from the RIWP will be updated and incorporated into the RI Report.

7. Site inspections have confirmed that the pre-existing deep wells have been destroyed. Additional discussion of deep groundwater appears under Comment 40.

4.1 Site Conceptual Model

8. We do not understand the comment. The conceptual model is intended to apply to the site itself; there is no off-site information to support a more expanded model of the site area. Please clarify.

4.2.1 Areas of Concern

9. The selected AOCs are not intended to be representative of the entire site: they were biased toward the worst-case areas of the site. The text should state that, although additional source areas cannot be ruled out based on the five locations sampled, the detailed historical research performed in the selection of these areas suggests that these are the locations most likely to have been impacted through historical site practices.

10. Troy is not intending to dismiss the soils on site as historical fill. We are aware that many of the constituents on site are related to discharges and would not meet the criteria of historical fill. On the other hand, certain of the constituents present are undoubtedly attributable to the nature of the fill material and not site activities. Therefore, the historic fill concentration comparisons were intended to distinguish site constituents from regional/historical background conditions. Specifically, we believe that arsenic, PAHs, and cadmium are not site chemicals of concern (COCs), but associated with fill or industrial activities that pre-existed Troy's use of the site.

4.3 Data Review

11. Agreed: Appendix C will clarify that the authors (EMCON) performed the data review, in conjunction with follow-up research requested from the laboratories.

Ecological Site Characterization (ESC)

12. Discussion of issues related to Newark Bay and ecological risk appear under Comments 49 and 59.

13. The presence of accumulated sediment in the creek does not mean that a viable biological community could be present. In particular, low dissolved oxygen (D.O.) content (see Table 4 of RI Addendum Report) is a universally limiting factor. The lowest D.O. observed was at SW-4, the upstream site boundary, indicating that the water entering the site area is already degraded. Other critical limiting factors are the concrete bottom of the creek and the absence of banks to support vegetation due to the concrete sides of the channel. In fact, the creek's only function is as a drainage ditch for stormwater conveyance.

    While it is possible that, in the absence of chemical inputs, there would be some limited benthic community, these organisms would be extremely pollution tolerant and would not represent an ecological community of value. Language to this effect can be added to the report, if the Department wishes.

14. There are two separate issues in this comment. First, Troy acknowledges that historical stream inputs may have migrated downstream. However, this does not mean that it is possible at this juncture to determine what impacts any given location downstream can be conclusively tied back to the site.

    Second, the Department's comment that all contaminant sources "above appropriate ecological criteria... must be remediated" fails to distinguish between a cleanup standard and an ecological screening value. There are no standards for sediment, and screening values, which range considerably and are of varying technical basis, are intended to serve as a trigger for additional evaluation, not cleanup. As part of future ecological risk work, Troy may develop site-specific cleanup goals for sediments. At present, however, levels requiring remediation have not been identified.

12. All historic surface water and sediment data appear in Appendix A.

13. Detection and quantitation limits for all data collected as part of the RI appear in the data tables as the last column. Detection limits for sediment were inadvertently omitted from Table 13; a revised table is attached. The full laboratory reports, submitted under separate cover, provide additional analytical details.

    The historical data tables in Appendix A present all the results available to us. Where detection limits are not shown, we do not have this information.

    No TICs were analyzed, since the Work Plans did not call for any GC/MS library searches.

5.1.2 Results

14. As described in Section 5.1.1, and, samples were selected for VOC analysis based on field screening with a photoionization detector and, in accordance with Section 4.6(b) of the Tech Regs, head space analysis. The boring log for TB/MW-1 (Appendix E) reveals that the VOC readings for the 0-2-foot interval were an order of magnitude higher than for deeper samples. Therefore, analysis of this interval for VOCs was intended to characterize the maximum concentrations present.

    Where statements are made concerning the overall presence of constituents that were not analyzed in all samples, the text will be clarified to that effect. However, it is unlikely, based on field screening, that significant VOC concentrations exist in soil intervals not analyzed.

15. Agreed: we will note the field observations. However, as detailed below, we do not believe that a petroleum problem is associated with the site.

16. It is possible, although not confirmed, that petroleum products reside in the fill. The green sheen noted is a regional problem and, as discussed in Section 2.2, almost certainly related to dye products historically manufactured on what is now the Albert Steel/Prentiss Drug (ASD/PD) site. Residual (below-criteria) levels of PAHs such as fluorene are probably related to the coal and cinders noted in the fill. There is no historical evidence of site activities that would have resulted in petroleum discharges. Additional related discussion appears under Comment 38.

    Regarding vertical delineation of petroleum to the water table, we would like to point out that semivolatile constituents were analyzed (and found to be below IGWSCC) in all locations in the depth interval immediately above the water table (Table 3) and were confirmed to be essentially nonexistent in groundwater (Table 8). These results adequately demonstrate the absence of petroleum leaching to groundwater.

    Overall, the VOC presence on the site does not appear to be attributable to petroleum. However, should any soil borings be installed in the future, samples will be collected down to the water table.

17. We have stated elsewhere in the report that VOCs are migrating from shallow groundwater into the creek. We are uncertain, however, how the Department wishes to integrate this issue into the discussion of the fill. We propose to add a statement indicating that VOCs detected in TB-2 may be the source of the groundwater impacts in MW-2, which in turn may be a source of the VOCs detected downstream in the creek.

18. Agreed: The statement regarding TCLP leachability in groundwater will be deleted. However, we continue to believe that the TCLP data are a reasonable reflection of site

dynamics. Although not attaining concentrations over the regulatory limits, some leaching of VOCs (notably benzene and chlorinated solvents) is apparent, a finding that is consistent with the conclusion that VOC release is occurring to a limited extent.

5.2.3 Permeability Tests

19. Agreed: A brief discussion on the Graphic Well Analysis Package (GWAP) will be added.

20. The water level measurements for MW-2S and MW-1S, both on ASD/PD property, were obtained from Jeff Story of the Department. We have verified that the data reported are consistent with the results provided. The results do indicate a marked groundwater divide and a rather steep gradient toward Wilson Avenue on the ASD/PD site. The specific characteristics of the ASD/PD site that may be related to this pattern are not relevant to the Troy site.

5.2.7 Results

As you are aware, we have requested the interim specific GWQC (July 16, 1998). Please forward these at your earliest convenience. When we receive them, we will cite them in the report as appropriate. However, they are not promulgated standards and therefore can only be used for screening or advisory purposes.

5.3 Surface Water

21. Agreed: The exceedance of surface water standards for PCE in SW-8 and SW-9 has been noted in the Addendum RI Report and will be added to the RI Report.

22. The investigation of and ultimate control of groundwater discharge to surface water is a complex issue that must be addressed in the context of regional activities. Further discussions between Troy and the Department are needed to address this issue.

23. The source of the low-level PCBs reported in SW-8 and SW-9 in the first sampling event (May 1997) is not known. PCBs were not detected at these locations in the associated sediments or in the subsequent sampling event (December 1997), nor is there any evidence of current or historical site activities involving PCBs.

With regard to inorganics, there is a pattern of arsenic in surface water that suggests some site discharge impacting the area of SW-8 and SW-9. However, there is also an apparent regional arsenic input, based on maximum concentrations in SW-12 (see Comment 25 for additional discussion on this sampling point). There is no known arsenic source on the site, nor did a review of historical operations indicate use of arsenic. Furthermore, the fill data do not indicate arsenic presence at concentrations that would be a major contributor to groundwater or surface water.

Inorganic presence in Pierson's Creek surface water appears to be related to mobility in groundwater. While most inorganics of concern, notably mercury and lead, were trace or absent in the low-flow samples, arsenic and manganese showed significant groundwater presence even using low-flow sampling techniques. These inorganics were also elevated in surface water. On this basis, it would appear that at least a portion of the arsenic and manganese presence in Pierson's Creek surface water is a result of mobility in and subsequent discharge from groundwater. The possibility that surface water inorganic presence is a function of solids being resuspended from sediment could be addressed through the collection of both filtered and unfiltered surface water samples.

Water elevation contour data have shown that the intermittent tributary is not a discharge zone for site groundwater, and there is no run-off to this waterway from site areas. Therefore, contamination in the tributary is the result of upstream surface water inputs.

24. Agreed: the text will be revised to refer to SW-12.

25. Location SD/SW-12 is just downstream of the northern site boundary. The water in this area consists of run-off that appears to come from the north and west of the-site. The water level contour maps indicate that flow is toward Pierson's Creek, which is a regional discharge zone. Groundwater flow from the western portion of the site is eastward, toward the center of the site, and does not have a flow component into this tributary. Since there is no run-off from the site (all run-off is collected and treated), drainage surface water from upstream is the only possible source of water to this flow path.

    Please note that SW-13 was collected in a pooled area somewhat to the east of the intermittent tributary channel, as there was no water immediately upstream of the site in the tributary channel itself at the time of the initial sampling event. SW-13 represents water quality of a portion of the likely input to the tributary. However, during higher-flow periods, flow from the ASD/PD site directly to the north probably contributes a much greater volume. Therefore, lower concentrations in SW-13 than SW-12 do not necessarily indicate that upstream inputs are not the source of constituents present in SW-12 or further downstream along the Troy site.

    We will further discuss the presence of arsenic, cadmium and mercury in surface water samples.

5.4 <u>Sediment</u>

26. In an urbanized, degraded system, an exceedance of a standard or criterion does not necessarily indicate an impact from a given source. Furthermore, sediment criteria are screening levels and are not intended to indicate impact, but only the potential for impact.

However, the language will be modified to avoid stating that decreasing concentrations do not necessarily indicate absence of impact.

5.4.2 Results

27. Agreed: standards and criteria can apply to future or potential site conditions. For this reason, standards and criteria are shown on all data tables for reference. However, it is important to consider that certain uses of the site or area are not reasonably anticipated (do not meet the stated "ability to reinstate previous quality and use" criterion). These include use of shallow groundwater in the area for water supply, use of the site or immediate vicinity for residential purposes, and fish propagation in areas where dissolved oxygen levels are incompatible with fish survival. The ultimate remedial action for the site should not be based on standards or criteria, but on the prevention of site discharges that may further degrade the area as it exists or is likely to exist in the foreseeable future.

28. Agreed: the addition to Figure 14 will be made.

6.0 Fate and Transport Evaluation

29. Agreed: "DCE" will be replaced with "arsenic" in the methylation statement.

30. A full citation for the reference Manahan, 1994, was not provided in the Department's letter, and this article could not be found by searching the open literature. It is the general consensus in the literature that methylation reduces arsenic toxicity; however, if the Department can provide a copy of this reference, we will be happy to review and cite it as appropriate.

[no 31-35]

36. Troy is intending to undertake further study of the groundwater-to-surface water pathway, which will include as necessary additional evaluation of leaching from fill to groundwater. The Synthetic Precipitation Leaching Procedure may be used to directly assess leachability. However, we wish to point out that the exceedance of a standard or criterion is not evidence of any particular migration pathway. Given the nature of the area, many cleanup criteria are exceeded on a regional basis. Site-specific migration can only be inferred based on concentration relationships on and around the site and documentation of constituent movement.

6.2 Identification of Existing and Potential Migration Pathways

37. There are two separate issues addressed in this comment.

The first part of the comment involves the potential for variability in the fill and resulting partitioning into groundwater. It is certainly true that conditions can vary. However, the overall conditions at the site indicate low leaching potential on a site-wide basis. This conclusion is supported by the finding that inorganic concentrations in groundwater, when measured using low-flow techniques, are very low compared with concentrations in the fill. For VOCs, the concentrations in MW-2 suggest that partitioning from fill to groundwater is occurring somewhere on the site.

The second issue pertains to mercury historically reported in deeper groundwater. Whether or not vertical migration could have occurred through the material underlying shallow groundwater is unrelated to the discussions of current leaching potential from fill to shallow groundwater. The issue of deep groundwater is addressed under Comment 40.

6.2.2 Groundwater

38. The data were reviewed to determine the potential for free product in accordance with USEPA guidance ("Estimating Potential for Occurrence if DNAPL at Superfund Sites," 1992). The attached table shows solubilities and the calculation of effective solubilities for the monitoring event with highest concentrations for the most contaminated groundwater sample (MW-2, November 1997). The concentrations present are all well below 1% of the solubility limits, and also well below the calculated effective solubilities. Total soil organic concentrations are also orders of magnitude below the criterion of 10,000 ppm (please note that the concentration of fluorene in TB-1 S-1 is 16 ppm, not 16,000 ppm as stated in the Department's letter). The sheens observed may be related to the fluorescent dye pervasive throughout the area. Altogether, the data suggest that while the presence of free product cannot be ruled out, it is not likely, even at the most impacted location.

    As stated, the five borings provide only a partial picture of site conditions. Any future investigations in the fill will include additional data to characterize the potential for product. However, the results do not suggest that the potential for product is a particular concern for this site, and should not be the basis for future activities.

39. The boring logs for the wells installed at the site in 1981 will be added to Appendix B. Available aquifer testing results (for the three deep wells and one of the shallow wells) will also be included.

40. We continue to believe that the subsurface conditions at the site are inconsistent with significant vertical migration. This opinion is supported by the ASD/PD results, which demonstrated general absence of inorganic contamination in deep wells (screened in the glacial till, the same unit as the deep wells installed at the Troy site in the early 1980s). In addition, given the relatively low levels of mercury detected in shallow groundwater (with only one observation over the standard of 2 ug/l), shallow groundwater is not a significant

source of mercury to underlying strata. Furthermore, deep groundwater quality will not provide useful information related to proposed remedial activities. On the basis of all of the above, investigation of deeper strata is unwarranted.

6.2.3 <u>Surface Water</u>

41. The surface water results tables (Tables 10 and 11 in the RI Report and Tables 2 and 3 in the RI Addendum Report) show the detection limits for all samples. Exceedances of surface water standards are bolded. Table 22 in the RI Report (attached) shows concentration ranges, geometric means and ecological criteria. The 95% UCL will be added.

42. There is currently no way to assess whether site-related chemicals may have migrated beneath the concrete liner. However, the following is true to the best of our knowledge:

   - The presence of the concrete liner pre-dates site activities associated with mercury.
   - There are several feet of sediment in the creek.
   - While not necessarily watertight in all locations, based on soundings performed during the sediment collection program, the liner appears to be continuous.

   This information suggests that both the channel lining and sediment deposited prior to mercury-related site discharges would likely have served as barriers to deeper migration of mercury. However, we have no way of confirming this theory with current or reasonably obtainable information.

43. To the best of our knowledge, there is no liner in the tributary. The bottom is sediment.

44. The requested figures will be prepared.

6.2.5 <u>Site Conclusions</u>

45. The observed pattern of constituent presence in sediments does not prove or disprove any particular historic sediment transport model, and mercury appears to be present throughout the sampled portion of the channel. Mercury generally present in Newark Bay is of multiple origins.

7.1 <u>Step 1: Screening-Level Problem Formulation and Ecological Effects Evaluation</u>

46. The presence of *Phragmites* is not in and of itself evidence of wetlands. The wetlands were mapped in the DPCC Plan in accordance with N.J.A.C. specifications, and no wetlands along Pierson's Creek were identified.

7.1.2 Exposure Pathway and Route Evaluation

47. Agreed: The results of the well search completed as part of the DPCC Plan will be provided.

48. Agreed (see Comment 44).

7.1.3 Preliminary Chemicals of Concern (COCs)

49. Table 22 shows the screening levels for surface water and sediment.

We strongly disagree that any exceedance of screening levels automatically makes a constituent a site COC. To evaluate risk based on total concentrations in an area of widespread environmental degradation will not provide any meaningful input into the evaluation of remedial alternatives for the site. Recent USEPA guidance ("Guidelines for Ecological Risk Assessment," 1998) recommends that assessments initiated with "an identified source" (such as a site undergoing an RI) be set up to "focus only on the source under evaluation and calculate the incremental risks attributable to that source." In addition, USEPA guidance stresses the performance of ecological risk assessment in the context of management goals, particularly sustainability.

Ecological risk assessment is one of the tools used to evaluate appropriate options for site releases. It is well documented that the region is seriously degraded with respect to ecological resources; performing assessments based on all constituents present would demonstrate this, but would not assist with the management of the Troy site. In order to provide useful information, we recommend that any further ecological risk work focus on the constituents that are clearly elevated in relationship to the site. The presence of background contamination would be considered in the context of additional stressors.

50. As discussed in Section 7.1.5 and summarized in Table 22, various ecological benchmarks were researched and considered. The values developed by MacDonald will be added. Please note that the 1992 publication cited, produced for the Florida Department of Environmental Protection [FDEP], was confirmed by FDEP to be out of print and cannot be obtained. However, the guidance values presented in MacDonald et al, 1996, are presumably the same.

51. Tables 20, 21 and 22 are attached.

52. As discussed under Comment 49, exceedance of a standard or criterion does not automatically mean that the constituent is a site COC. It must be recognized that GWQC for many analytes are exceeded throughout the area. Again, we stress that site investigation and evaluation activities be performed with the ultimate goal of establishing site-specific remediation goals that will prevent site-related impacts to the environment. To do this

effectively, all assessments must distinguish between site and background contamination. Furthermore, concentrations in soil *per se* are not relevant, since soil is not a medium with potential for contact with ecological receptors. The extent to which constituents in fill are or may historically have been released to the creek should be assessed based on measured concentrations in surface water and sediment.

7.1.5 Screening-Level - Ecological Effects Evaluation

53. Class SE surface water standards for some constituents are based on aquatic life endpoints. However, this is not the case for any of the COCs listed in Table 22 (all are "h," noncarcinogenic human health, or "hc," carcinogenic human health, basis).

Based on salinity measurements in Pierson's Creek (2 to 6 ppt; see Table 4 of the Addendum RI Report) the entire study area is saline/estuarine, and therefore Class SE standards apply.

54. As discussed above, some Class SE standards have been developed based on protection of aquatic life, but not for any of the site constituents.

55. As stated in Section 7.1.5, EPA has not developed specific AWQC for any of the VOC COCs, but has provided toxicity thresholds, which are cited and shown as screening values in Table 22. No surface water screening levels were identified in any of the sources located and presented. The values developed by MacDonald are for sediment, not surface water (and also exclude VOCs).

56. The report references the NJDEP sediment quality guidance update (1997), which uses the 1995 Long et al screening levels. The upstream limit of the salt wedge is not known. Based on the salinity measurements, we will continue to use the saline/estuarine screening levels.

57. The 1995 NOAA guidelines are already referenced (as NJDEP screening levels). The Persaud guidelines do not distinguish between freshwater and marine conditions, nor is their basis published for review. Therefore, we cannot confirm that they are valid criteria and cannot consider them.

58. In the initial Work Plan Addendum (submitted to the Department on February 5, 1996), analysis of organic mercury in soil and groundwater was proposed by EPA Method 245.3. Department comments dated August 20, 1997, indicated that this method was not suitable for use in soils and sediments. In a subsequent phone conversation (September 20, 1996, summarized in a written memo dated September 24, 1996), EMCON and the Department agreed that the RI would address total mercury only, since no alternate method could be found.

If in the interim the Department has approved a method for either inorganic or organic mercury to allow speciation, please provide it and we will add it as appropriate to any future analytical programs.

7.3 Baseline Risk Assessment Problem Formulation

59. As part of the Work Plan for any additional sediment investigations, we would contact the City of Newark to obtain any available information on the storm lines and other physical features associated with the creek.

We have reviewed the August 1997 Dames & Moore hydraulic study performed for the City ("Draft Hydrologic and Hydraulic Study for the Rehabilitation of Pierson's Creek"), which does not contain any specific information on the creek's drainage downstream of Turnpike Interchange 14, which was beyond the scope of the project. Dames & Moore confirmed that the inverts to both the 48-inch reinforced concrete pipe (RCP) at the Lehigh Valley Railroad (upstream of the interchange) and the twin 60-inch diameter RCPs (at the interchange, which convey stormwater allegedly to the Passaic River via the Port Newark Channel) are below mean sea level (MSL). This suggests that sediment transport would be attenuated, since the gradient between seawater and the inlet would be reversed. Transport would be limited to suspension in surface water during storm events and would not occur via gravitational sediment movement. Indeed, Dames & Moore observed "much less sediment deposition, shoaling, or bank scouring" below the railroad.

Overall, these observations suggest that sampling along the "open segments of the storm pathway" will provide little or no information as to what may have historically reached Newark Bay.

8.0 Summary and Recommendations

60. Additional characterization of the significance of the groundwater-to-surface water pathway is recommended. We see no evidence, however, for the presence of unidentified contamination sources in the fill that are impacting groundwater. Significant organic groundwater presence (which consists of VOCs only) appears to be localized (limited to MW-2). Mercury, despite concentrations in the fill up to the thousands-of-ppm range, is undetected in a majority of wells and only present above the groundwater standard in one well (MW-3; 0.012 ppm), indicating very minimal mercury partitioning from fill to groundwater.

While Troy may consider additional soil investigation to delineate the impacts in the vicinity of TB/MW-2, a detailed site-wide program to characterize subsurface conditions in many locations is unlikely to yield information to assist with addressing the groundwater-to-surface water pathway.

With regard to the potential for vapor hazards in buildings, preliminary evaluation indicates that it is unlikely that even the maximum soil concentrations observed would contribute to ambient air levels above occupational standards. Using EPA methodology (EMSOFT modeling) and equations, the State of Michigan has developed soil criteria protective of air quality; these Soil Volatilization to Indoor Air Criteria and VOCs detected at the Troy site, along with the maximum site concentrations of site VOCs, are summarized below:

Chemical	Criterion (ug/kg)	Maximum Site Concentration (ug/kg)
Benzene	8400	3000
Chloroform	38,000	660
Tetrachloroethene	60,000	700
Toluene	250,000	200

The criteria are based on conservative estimates of exposure and public health-based (vs. occupational) acceptable risk estimates, and maximum site concentrations are still below levels of concern. Furthermore, many of the buildings at the Troy facility are not entirely enclosed, which means that vapor accumulation would be far lower than in a typical structure. Therefore, Troy has concluded that it is extremely unlikely that volatilized chemicals from underlying fill could be resulting in exceedances of occupational limits, and this issue will not be further evaluated.

The exact chemical concentrations associated with subsurface materials that would remain in place are not known throughout the site. Given the high water table (which severely limits use of the subsurface) and the concrete cap, subsurface contact is limited and infrequent (e.g. repairs to utility corridors). In lieu of extensive intrusive investigations, Troy is willing to consider a DER that would assume worst-case conditions in the subsurface and require appropriate health and safety mitigation measures.

We do not understand the comment regarding "possible off-site soil contamination related to the site that occurs uninterrupted from the property boundary." Soil contamination can migrate laterally either overland (via entrainment in run-off) or through partitioning into shallow groundwater and subsequent adsorption following groundwater transport. Soil contact with run-off at the site is prevented by the cap, but is also not likely to have occurred historically due to the drainage patterns (toward the creek in the center of the site). Similarly, all shallow groundwater under the site moves toward and discharges to surface water. There is no intervening other property that could have been impacted.

Overall, therefore, we do not see that there has even been a potential for impact to fill on neighboring properties. Contamination that may exist in fill on adjacent properties would be a function of historic fill conditions or industrial uses of the larger parcel of which the site was once a portion that pre-date Troy Chemical activities. These would not represent RI issues.

Finally, as discussed under Comments 14, 26 and 27, exceedances of standards or criteria, or even evidence of contamination, are not necessarily indications for remediation. Chemical concentrations must be evaluated in the context of regional conditions, site attributability, feasibility, sustainability and a range of other factors that are not assessed until the RAA. We agree that additional study is warranted, and do not feel that conclusions regarding the need for action with respect to specific media are warranted at this point in the RI/RAA process.

We appreciate the offer to meet with you, and look forward to resolving these issues at a meeting next month. At that time, we can determination the nature of additional studies and provide a schedule for submittal of associated Work Plan documents. In the interim, please review our comment responses and contact use with any questions so that our meeting can be as productive as possible.

Sincerely,

EMCON

Tamara L. Sorell

Tamara L. Sorell, Ph.D.
Senior Environmental Scientist

cc: E.J. Capasso, Troy Chemical Corporation, Inc.
J. R. Fallon, Environmental Liability Management, Inc.
T. Schwartz, Schwartz, Tobia and Stanziale, Becker, Rosensweig & Sedita

ATTACHMENTS

Table 13
Troy Chemical RI/RAA
Summary of Inorganics in Sediments

Sample ID Date Sampled	Sediment Screening Value[1]	SD-01 5/20/97		SD-02 5/20/97		SD-03 5/20/97		SD-04 5/20/97		SD-05 5/20/97		SD-06 5/20/97		SD-07 5/20/97	
Inorganic Elements (mg/kg)															
Aluminum	NA	14200		6280		12300		14100		16600		12200		16500	
Antimony	NA	36.0		52.7	U	23.5	U	26.1	U	25.8	U	27.9	U	36.3	U
Arsenic	8.2[2]	**357**		**9.40**		**14.4**		**17.4**		**22.1**		**135**		**52.0**	
Barium	NA	344		381		330		284		314		350		297	
Beryllium	NA	1.64		1.82		1.17		1.19		1.32		1.32		1.71	
Cadmium	1.2[2]	**16.2**		**9.25**		**11.5**		**11.4**		**14.1**		**19.9**		**16.8**	
Calcium	NA	13200		6430		11100		12200		11400		12700		13400	
Chromium	81[2]	78.7		140		62.0		76.1		89.6		150		152	
Cobalt	NA	22.7		19.7		11.3		10.5		22.0		84.5		130	
Copper	34[2]	**474**		**364**		**322**		**417**		**521**		**544**		**569**	
Iron	NA	47100		27000		23500		26200		32400		31100		41300	
Lead	47[2]	**1070**		**1680**		**678**		**765**		**972**		**1860**		**4500**	
Magnesium	NA	5560		2490		4480		5820		7220		4760		6350	
Manganese	NA	270		118		154		186		261		300		274	
Mercury	0.15[2]	**101**		**138**		**21.5**		**7.33**		**12.5**		**1890**		**3030**	
Nickel	21[2]	**72.5**		**91.5**		**119**		**64.9**		**77.6**		**62.2**		**83.7**	
Potassium	NA	1460		867		1400		1710		1740		1480		1845	
Selenium	NA	36.6	U	52.7	U	23.5	U	26.1	U	25.8	U	27.9	U	36.3	U
Silver	1.0[2]	3.96	U	5.47	U	2.35	U	2.49	U	2.63	U	22.0		8.00	
Sodium	NA	3030		4560		2240		3870		4850		4360		4660	
Thallium	NA	1.46	U	2.11	U	0.940	U	1.04	U	1.03	U	1.11	U	1.45	U
Vanadium	NA	54.1		24.1		46.3		55.0		63.0		55.5		68.0	
Zinc	150[2]	**1390**		**906**		**1020**		**1300**		**1650**		**1560**		**1680**	
Total Cyanide (mg/kg)	NA	37.1			U		U	22.6		6.96		27.9		22.4	
Total Organic Carbon (%)		29.8%		12.5%		27.7%		24.5%		58.3%		24.3%		16.0%	
Grain Size															
% Clay		15.0		12.0		12.5		15.4		13.3		10.7		12.4	
% Silt		69.2		47.3		53.1		75.2		78.9		60.9		46.3	
% Sand		15.8		40.7		34.3		9.4		7.8		28.4		41.3	
% Gravel		0.0		0.0		0.0		0.0		0.0		0.0		0.0	

NA- Not available

[1] NJDEP, 1997.

[2] Screening Level. NOAA Effects Range-Low (ER-L) values for marine/ estuarine sediments.

[3] MDLs are based on no dilution. As and Hg were analyzed at varying dilutions.

Table 13
Troy Chemical RI/RAA
Summary of Inorganics in Sediments

Sample ID Date Sampled	Sediment Screening Value[1]	SD-08 5/20/97		SD-09 5/20/97		SD-10 5/20/97		SD-11 5/20/97		SD-12 5/20/97		SD-13 5/20/97		Detection Limit[3]
Inorganic Elements (mg/kg)														
Aluminum	NA	17100		14200		15300		13300		8900		10600		50.0
Antimony	NA	20.7	U	21.7	U	28.9	U	32.1	U	24.1	U	34.8	U	10.0
Arsenic	8.2[2]	**126**		**294**		**412**		**5760**		**791**		**284**		0.02
Barium	NA	369		330		312		156		153		196		1.00
Beryllium	NA	1.32		1.10		1.29		2.51		1.14		1.48		0.2
Cadmium	1.2[2]	**26.6**		**13.5**		**15.5**		**9.46**		**12.6**		**8.54**		1.0
Calcium	NA	15800		10400		10400		11300		17100		29100		100
Chromium	81[2]	135		113		101		396		56.4		80.4		3.00
Cobalt	NA	235		71.0		33.3		88.0		25.8		19.1		2.00
Copper	34[2]	**544**		**470**		**572**		**3590**		**305**		**254**		2.00
Iron	NA	43200		34000		37300		89000		21000		22100		30.0
Lead	47[2]	**2440**		**1240**		**862**		**1130**		**447**		**489**		10.0
Magnesium	NA	7180		6070		6980		7450		4760		4700		100
Manganese	NA	323		241		304		557		251		362		0.50
Mercury	0.15[2]	**2070**		**449**		**107**		**171**		**1520**		**1010**		0.025
Nickel	21[2]	**81.1**		**72.8**		**92.9**		**948**		**55.8**		**50.2**		3.00
Potassium	NA	1920		1770		1540		1290		898		1410		100
Selenium	NA	20.7	U	21.7	U	28.9	U	32.1	U	24.1	U	34.8	U	10.0
Silver	1.0[2]	20.1		16.1		13.3		18.4		2.46	U	3.65	U	1.00
Sodium	NA	3220		2940		4020		3150		2630		2780		200
Thallium	NA	0.829	U	0.868	U	1.16	U	1.28	U	0.964	U	1.39	U	0.40
Vanadium	NA	77.8		71.3		68.8		58.2		29.2		32.7		1.50
Zinc	150[2]	**1940**		**1770**		**1810**		**2690**		**1170**		**838**		5.00
Total Cyanide (mg/kg)	NA	15.8			U		U		U		U		U	0.05
Total Organic Carbon (%)		17.2%		29.3%		19.7%		17.2%		13.8%		11.5%		5.1-31.3%
Grain Size						default								
% Clay		9.0		9.5		12.2		16.7		16.0		11.0		
% Silt		67.4		53.5		72.2		73.1		65.4		56.6		
% Sand		23.6		37		25.6		10.2		18.6		32.4		
% Gravel		0.0		0.0		0.0		0.0		0.0		0.0		

NA- Not available

[1] NJDEP, 1997.

[2] Screening Level. NOAA Effects Range-Low (ER-L) values for marine/ estuarine sediments.

[3] MDLs are based on no dilution. As and Hg were analyzed at varying dilutions.

Table 20
Troy Cemical RI/RAA
Species Observed in the Site Vicinity

Species Observed		May 1997	June 1997
Common Name	Scientific Name		
Fauna:			
Common Grackle	*Quiscalus quiscula*	X	
Domestic Dog	*Canis domesticus*	X	X
Gray Catbird	*Dumetella carolinensis*	X	
Gull	*Larus* spp.	X	
Heron		X	
House Sparrow	*Passer domesticus*	X	
Killdeer	*Charadrius vociferous*	X	
Mallard Duck	*Anas platyrhynchos*	X	
Mockingbird	*Mimus polyglotos*		X
Mourning Dove	*Zenaida macroura*	X	
Muskrat	*Ondatra zibethica*	X	
Red-Winged Blackbird	*Agelaius phoeniceus*	X	
Robin	*Turdus migratorius*	X	X
Snail	*Helisoma* spp.	X	X
Song Sparrow	*Melospiza melodia*		X
Starling	*Sturnus vulgaris*	X	X
Swallow		X	
Unknown tracks (likely rat or other small mammal)			X
Water strider	*Gerris conformis*		X
Flora:			
Bittersweet nightshade	*Solanum dulcamara*		X
Bladder campion	*Silene cucubolus*		X
Common elderberry	*Sambucus canadensis*		X
Common Nightshade	*Cuscuta gronovii*	X	
Common Reed	*Phragmites australis*	X	
Curly Dock	*Asclepias sp.*	X	
Dodder	*Ipomoea sp.*	X	
False bamboo			X
Japanese Knotweed	*Polygonum cuspidatum*	X	
Milkweed	*Solanum dulcamara*	X	
Morning Glory	*Ipomoea* spp.	X	X
Mugwort	*Artemisia vulgaris*	X	
Mulberry	*Morus rubra*	X	
Poison Ivy	*Toxicodendron radicans*	X	
Smartweed	*Polygonum* spp.	X	X
Staghorn sumac	*Rhus typhina*	X	X

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Table 21
Troy Chemical RI/RAA
Summary of Ecological Exposure Pathways and Routes

Medium	Exposure Pathway		Exposure Route	
	Description	Significance	Description	Significance
Soil/Fill	Partitioning (leaching) to shallow groundwater	Minor: the cap prevents infiltration and soil chemistry strongly favors adsorption	None	No contact possible
Groundwater	Discharge to surface water	Minor: the infiltration control and soil/groundwater chemistry limit contaminant transport in groundwater; colloidal transport remains possible	None	No contact possible
Surface Water	Downstream migration	Moderate: contaminants in surface water would be readily transported downstream; however, contamination in surface water is relatively minor	Direct contact Use as aquatic habitat Use a drinking water	Minor on site: there is little or no wildlife in the site area Moderate downstream: ecological communities exist in the aquatic systems that Pierson's Creek drains into; however, presence of site contaminants in downstream surface water is likely to be low, since surface water contamination is minor
	Partitioning into sediments	High: the system appears to highly favor adsorption rather than solubilization	See sediment	
Surface Water	Volatilization into ambient air	Low: surface water contamination with VOCs occurs in a very limited area; air inputs are likely to be negligible compared with ambient air background in a heavily industrial area	Inhalation on site	Negligible: little or no wildlife in the site area; major background air contamination already exists
	Bioconcentration	High for Hg downstream of site; *de minimis* for VOCs	Dietary exposure (piscivorous animals)	No potential on site; major significance downstream

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Table 21
Troy Chemical RI/RAA
Summary of Ecological Exposure Pathways and Routes

Medium	Exposure Pathway		Exposure Route	
	Description	Significance	Description	Significance
Sediment	Downstream migration (sediment transport)	Moderate: downstream movement of VOCs is likely minimal; Hg found downstream may be site related	Direct contact by aquatic life	Minor on site: there is no aquatic life in Pierson's Creek in the site area, and almost none in the intermittent tributary Moderate downstream: ecological communities exist in the aquatic systems that Pierson's Creek drains into
	Suspension into surface water	Minor: likely to occur only during construction activities or major storm events	See surface water	
	Bioconcentration	High for Hg downstream of site; *de minimis* for VOCs	Dietary exposure (piscivorous animals)	No potential on site; major significance downstream

Table 22
Troy Chemical RI/RAA
Screening Values for Ecological Risk

	Surface Water (ug/l)					Sediment (mg/kg)						
	Concentrations Observed On-Site[1]		New Jersey Surface Water Standard[3]	USEPA Ambient Water Quality Criterion[4]	Preliminary Remediation Goal[6]	Concentrations Observed On-Site[9]		Concentrations Observed Downstream[10]		NJDEP Sediment Screening Value[11]	NOAA Effects-Range-Medium[11]	Preliminary Remediation Goal[6]
	Range	Geometric Mean[2]				Range	Geometric Mean[2]	Range	Geometric Mean[2]			
Chemical of Concern												
As	56-2400	430	NA	36	190[7]	22-5760	240	53-529	180	8.2	70	42
Hg	ND-5.2	0.90	NA	0.025	1.3[8]	13-3030	370	350-5000	3400	0.15	0.71	0.7
Benzene	2.2-160	21	NA	700	130	ND-582	7.9	<1	<1	NA	NA	160
2-Butanone	ND	ND	NA	14,000	14,000	ND-3.3	2.0	<50	<50	NA	NA	0.27[12]
Chlorobenzene	ND-5.6	0.92	NA	129[5]	64	ND-7.6	0.83	<1	<1	NA	NA	417
1,1-Dichloroethane	ND-129	6.9	NA	NA	47	ND-12	1.0	<10	<10	NA	NA	0.027
1,2-Dichloroethene	ND-299	10	NA	NA	590	ND-0.43	-	<1	<1	NA	NA	4.3
Ethylbenzene	ND	ND	NA	NA	7.3	ND-16	0.97	<100	<100	NA	NA	5.4
Tetrachloroethene	ND-29	3.3	NA	450	98	ND	ND	<1	<1	NA	NA	3.2
Toluene	ND-33	3.5	NA	5000	9.8	ND-70	2.2	<500	<500	NA	NA	0.050
Xylenes	ND-11	2.6	NA	NA	13	ND-107	3.1	<10	<10	NA	NA	0.16

ND - Not detected.
NA - Not available.
All site concentrations shown to 2 significant figures.
[1] Samples SW-8, SW-09, SW-10 and SW-12; see Tables 10 and 11.
[2] One half the detection limit used for nondetects; a dash indicates that, due to a large proportion of nondetects, the calculated GM exceeds the maximum observed.
[3] Class SE waters. All standards are based on protection of human health, not on aquatic endpoints, and are therefore not appropriate screening values for ecological endpoints.
[4] Chronic saltwater AWQC (Hg, As[III]) or value as low as which chronic toxicity occurs to saltwater life.
[5] Chlorinated benzenes.
[6] USDOE, 1996. Based on protection of aquatic life.
[7] A PRG of 3.1 ug/l also exists for As(V).
[8] The PRG for methyl Hg of 2.6×10^{-3} cannot be compared with measured site values.
[9] Samples SD-5 through SD-12; see Tables 12 and 13; note unit conversion from ug/kg to mg/kg.
[10] Kimball samples SED-01 through SED-09; see Table 16; no data for Hg in SED-07 and SED-09.
[11] NJDEP, 1997.
[12] Derived based on equilibrium partitioning; only applies to benthic life.